ECONOMIC STATUS OF THE GRAPE INDUSTRY

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In cooperation with

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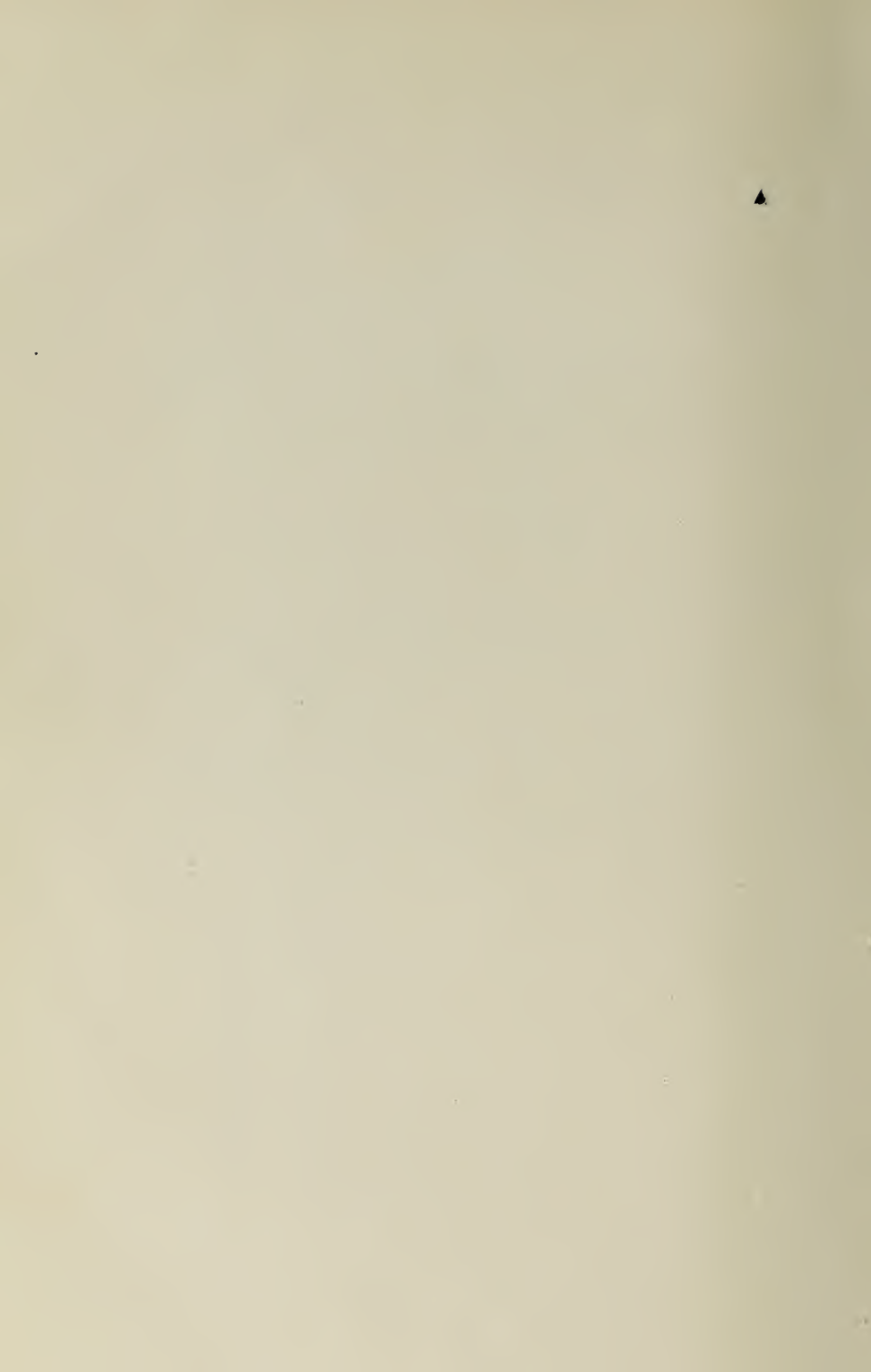BULLETIN 429

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FOREWORD

This bulletin represents the results of a cooperative study by the Department of Research of the California Development Association and the Division of Agricultural Economics of the College of Agriculture. Under an agreement, entered into in 1926, these two institutions have shared in equal measure the responsibility and expense of preparing the material included herein. As the result of this arrangement, a preliminary study projected and undertaken by Mr. W. L. Connolly of the California Development Association has been combined with subsequent investigations to the end that a much more comprehensive publication is made available than would otherwise have been possible at the present time.

The primary object of this study has been to analyze the chief available statistical data relating to the industry as a basis for a partial and tentative answer to the question, ''what is the economic situation of, and the outlook for, California's fresh-grape industry?'' The study has been carried to the fullest extent warranted in a general survey, in view of the insistent demand for the information upon the part of agricultural agencies.

The question of market distribution, important as it is, has barely been touched upon in the present study, chiefly because of the lack of sufficient data to serve as the basis for making safe conclusions. There is urgent need, however, for a special and intensive study of this phase of the grape industry, but at the present time the means are not available for making the extensive first-hand studies which this would involve. Absence of available data at this time has also made it necessary to omit from this publication any discussion of the cost of producing grapes.

Those who wish quickly to get the gist of the study without reading it in detail will find brief *Conclusions* and a *Summary* given in the first few pages. In addition one may quickly visualize many of the chief facts by glancing at the figures and reading the brief story under each of these.

Preparation of the bulletin has been greatly facilitated by the generous assistance of many individuals and organizations. A list of these is given in the *Acknowledgments* on page 110.

ECONOMIC STATUS OF THE GRAPE INDUSTRY

S. W. SHEAR[1] AND H. F. GOULD[2]

CONCLUSIONS AND SUMMARY

The spectacular expansion in California's shipments, acreage, and production of grapes in the last ten years has resulted in a serious decline in the farm price and purchasing power of the whole country's output of fresh grapes and raisins since 1921 and 1922. Reliable estimates of California's increasing bearing acreage of wine and of table grapes indicate that with normal yields per acre the state production of these two classes of grapes will continue to expand during the next few years. Bearing raisin-grape acreage, on the other hand, is increasing little, if any, and hence the normal production of this class of grapes cannot be expected to increase appreciably, nor returns on raisins to fall to any considerable extent below those of recent years. Unless unexpected and important changes should alter the situation, there seems little likelihood that returns from fresh-grape production will appreciably improve for several years, and there is considerable likelihood that the price of wine-grape varieties will decline below the low level of 1926. With such an outlook, growers who cannot produce grapes at a cost as low as the returns prevailing in the last two years, or lower, should not consider expanding their output.

In trying to visualize the market outlook for grapes in the next few years, it is necessary to consider the fact that the production of other fruits, many of which compete with grapes for a place in the consumer's diet, has been outstripping demand at remunerative prices in recent years. The national, and particularly California's, output of tree fruits is increasing so rapidly that an abnormally large number of producers of these fruits have recently suffered from unprofitably low returns for their fruit, and more will undoubtedly suffer in the next few years.[3] Analysis of available data points to the fact that large increases in the total fruit production of the state consistently result in low prices to growers.

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[3] In summarizing the outlook for the whole fruit industry of the United States, The Agricultural Outlook for 1927 emphasizes the fact that ''the present trend of fruit production is upward and there is little on which to base hope for any marked improvement in prices over those secured during recent years.'' (U. S. Bur. Agr. Econ. Staff, The Agricultural Outlook for 1927. U. S. Dept. Agr. Misc. Cir. 101:4, 34. February, 1927.)

Effective technical methods have been devised for processing, preserving, and storing many of California's better grape by-products. Up to the present time, however, the market demand for such products has been insufficient to dispose of any appreciable quantity of grapes, and the outlook for large-scale utilization in this manner seems unpromising.

Although markets for fresh grapes can be increased somewhat by wider and more efficient distribution, it seems unlikely that any improvements in marketing which take place in the next few years will be sufficient to dispose of the forecasted normal production of California grapes at prices above those of the past two years. Any comprehensive plan for bringing substantial and immediate relief to the grape industry must recognize that there will in all probability be a normal over-supply of grapes in this country, at least during the peak weeks of the shipping seasons, in the next few years. Because of this fact, profitable marketing requires a plan that will avoid the harvesting and shipping of grapes of such quality or in such quantity as at any time to glut all markets and make prices generally too low to cover the cost of harvesting, transporting, and marketing.

Since by-products and improvements in marketing alone fail to promise adequate relief to the fresh-grape industry, ways and means of reducing costs of production, and of decreasing the commercial output of the industry must be considered. Both of these are problems of readjustment which growers must largely work out in the light of the particular economic conditions and choices which confront each as individuals. The question before each is how to make the best of the situation in which he finds himself. In many cases, without increasing the total acreage or production of grapes and without an increase in price, growers can increase their net returns by renting or buying at a fair figure neighboring acreage already in grapes. Others may find it possible to reduce costs, or increase yields out of proportion to costs, sufficiently to justify them in operating the same acreage of grapes as they have in the past. Some may find it profitable actually to uproot a portion of their vines and replace them with other crops. Still others will probably find that their best alternative —temporarily, at least—is to diversify somewhat more than has been their practice in the past. In extreme cases some growers may find it necessary even to discontinue farming for themselves and hire out for wages, either on the ranch or in the city.

The outstanding facts regarding the present status and recent developments in the grape industry which have led to the foregoing conclusions are summarized in the following four pages.

Among all the fruit shipments originating in the United States in the last few years, grapes have ranked second only to apples, averaging about 16 per cent of the country's total carlot movement of all fruits. During this same period California's grape shipments greatly exceeded those of any other California fruit or vegetable, averaging 27 per cent of the carloadings of all perishables in the state. The bulk of summer fruits in the United States moves before the heavy shipments of California grapes in September and October.

The rapid expansion in California grape shipments since the World War has largely been responsible for the fact that the country's total shipments of fresh grapes have doubled since 1920, increasing from about 37,000 carloads to 76,000. While California's shipments of grapes increased 125 per cent from 1920 to 1926, shipments originating in all other states increased barely 25 per cent. The percentage of the country's grape shipments from California rose from about 70 per cent in 1920 to an average of over 85 per cent in the last three years; at the same time, approximately one-half of the grapes produced in the state were dried for raisins.

The rapid expansion of the grape industry in California as compared with the rest of the United States has been primarily the result of prohibition, which caused a sudden and great reduction in the utilization of wine grapes by California wineries and a gradual but tremendous increase in eastern consumption of fresh wine and raisin-grape varieties for juice purposes. Before 1915 practically none of the grapes shipped from the state were designed for wine making. By 1921, however, almost 20,000 carloads of juice stock were shipped, and in the last two years an average of nearly 50,000 carloads, or approximately 70 per cent of California's grape shipments have been juice stock.

Of California's grape shipments in 1926, all of the wine-grape varieties, 16 per cent of the raisin-grape varieties, and about 13 per cent of the table-grape varieties were classified as juice stock. The chief California wine-grape varieties in their approximate order of importance as shipping grapes were Zinfandel, Alicante Bouschet, Carignane, Mission, Mataro, and Petite Sirah. The outstanding varieties of table grapes shipped were Malaga, Tokay, and Emperor; and of raisin grapes, Muscat and Thompson Seedless (Sultanina). Most fresh Muscat shipments and about half of the shipments of Malagas were juice stock. From 1920 to 1926 California's shipments of table-grape varieties increased about 80 per cent, wine-grape varieties practically doubled, and raisin-grape varieties increased over seven times. Of the 64,000 carloads of grapes originating in Cali-

fornia in 1926, about 40 per cent were wine-grape varieties, 37 per cent table-grape varieties, and 23 per cent raisin-grape varieties.

The diversion of nearly all the wine-grape production of the state and large quantities of raisin-grape production into the channel of fresh shipments, largely as juice stock, in the last few years is mainly responsible ·for the fact that California's shipments of grapes have increased much more rapidly than has her production or acreage. While the grape shipments of the state more than doubled from 1920 to 1926, acreage practically doubled, but production increased only a little more than 50 per cent.

Central and northern California each produces and ships more grapes than are grown in the whole country outside of California. Even the production of the southern district, although less than 5 per cent of the state's total output of grapes, is somewhat greater than that of New York, the most important grape-producing state except California. The *northern district* of California, the second most important grape-producing section of the country, has long been the center of *wine-grape* production in the United States. Production of raisin and table grapes in California is confined largely to the *central district,* which includes most of the San Joaquin Valley. For many years this has been the most important grape-producing section in the United States, and its proportion of the state's total production has steadily and rapidly increased. In 1925 the central district accounted for approximately 70 per cent of the total grape production of the United States, about 95 per cent of the total raisin crop, and more than 60 per cent of the nation's carlot movement of fresh grapes.

The increasing importance of California juice-stock shipments is in a large measure responsible for the enormous growth in the state's grape shipments during the months of September and October. The major peak of California grape shipments usually occurs about the middle of September and a large secondary peak near the middle of October. On the average, during the years 1913–1917, only slightly over 800 carloads of grapes a week rolled from California in the six weeks from the middle of September to the latter part of October. The average weekly movement during the same six weeks in the years 1922–1926 was over 4,800, or somewhat more than six times that of 1913–1917.

California's most serious competition with eastern (*labrusca*) grape shipments comes from the Great Lakes states, New York, Michigan, Pennsylvania, and Ohio, and usually occurs in a period of six weeks centering in October. The peak of United States shipments,

which normally occurs during this period, is caused by California's large but secondary peak, and by the heaviest movement of the season from the Great Lakes states. California can expect but little increase in the competitive shipments of grapes from this section, as the expansion of acreage between 1920 and 1925 was smaller than in any other important grape-producing area.

The very rapid rate of expansion of the *vinifera*-grape industry of Arizona in recent years has appreciably increased the competition which shipments of early California grapes are meeting in eastern markets in June and July. About one-fourth as many carloads of grapes were shipped from Arizona as from Imperial County in 1926. Arizona shipped almost 70 carloads of early grapes in 1926 compared with about 10 in 1920. Indications are that Arizona's output will continue to expand, as the number of vines, which is now nearly half as great as in Imperial County, increased about seven times from 1920 to 1925, or slightly faster than in Imperial County.

There is also rapidly increasing competition in late August and early September between California grape shipments and those from the Central West, particularly from the Ozark region in Arkansas and Missouri. These two states, which together shipped less than 50 cars of grapes in 1920, shipped about 1,900 carloads in 1926. The number of vines in the same period approximately doubled and, as many of the younger vines have not yet reached full bearing, further increases in the commercial output from these states may be expected.

California's full-bearing acreage of all grapes, with the exception of raisin grapes, promises to continue upward until 1928 at least, and therefore normal production can likewise be expected to increase somewhat in proportion. It is evident that, with 75 per cent of the grape vines in the United States on California ranches and a preference on the part of most consumers for *vinifera* varieties, this state will continue to furnish most of the country's supply of grapes. Even the possible decrease in shipments of juice grapes that might take place in case of rulings adverse to such movement, would not deprive California of her dominant position in the shipping of fresh grapes.

A study of the weekly variation in the prices of different varieties of grapes in 1924 and in 1926 discloses two general tendencies for nearly every variety: first, to be high in price early in the season; and, second, to rise in the latter part of September or more usually in October. Wine grapes and Muscats show less of a tendency to bring high prices in the first weeks they come upon the market than do table grapes, and more of a tendency to rise above the average

in October, the month in which the demand for juice grapes for wine-making purposes is usually the greatest.

The annual average prices of wine and of table-grape varieties in eastern markets have moved up and down together rather consistently. Prices of wine grapes, however, have averaged above those of table grapes in every year since 1917. Continuation of the rapid increase in shipments of wine-grape varieties will probably result in their price falling to about that of table-grape varieties within the next few years. The annual prices of fresh raisin grapes in eastern markets has consistently been much lower than those of wine and of table grapes and has shown no particular tendency to move closely with the prices of the latter two classes.

The high prices and the high purchasing power of fresh grapes from 1919 through 1922, and of raisins from 1919 through 1921, were responsible for stimulating a tremendous and unwise increase in the grape acreage of the state, the effects of which have since been shown in increased output and a considerable decline in prices and purchasing power. From 1917 to 1921 the purchasing power of both table and wine-grape varieties rapidly doubled and actual prices, because of the great decline in the purchasing power of the dollar, rose even faster. Since 1921 their price and purchasing power has declined precipitously. Returns per ton on California table-grape varieties have been below pre-war purchasing power in the last two years and, if anywhere near full crops are produced, will probably remain near this low level for the next few years. With an outlook for a considerable increase in the normal production of wine-grape varieties for several years, it seems probable that the purchasing power of these grapes will fall below the level of 1926.

TYPES OF GRAPES

Vinifera or European Type Most Important.—There are three main types of grapes produced in the United States—the *vinifera, labrusca,* and *rotundifolia* (muscadine). The *vinifera,* or European type, of which many varieties are grown in California, is by far the most important commercially, not only in the United States, but in foreign countries as well. Grapes of the *vinifera* type produce practically all of the world's wine; they are the only ones from which raisins and currants can be made; and they possess better shipping qualities than do American varieties.

California's output of grapes consists almost entirely of varieties of the *vinifera* species. In the United States the Mediterranean type

of climate with warm, dry, sunny summers essential to the successful production of the *vinifera* varieties, prevails over a large area only in California, to a more limited extent in Arizona, and in a few small sections in Texas.[4]   Arizona, however, is the only state, aside from California, in which any considerable area is suited to the production of the *vinifera* species.   A number of the larger river valleys and low mesas in Arizona below 2,500 feet elevation are specially suited to the production of very early Thompson Seedless (Sultanina) and Malagas.   ''Commercial grape growing in this area centers largely in the Salt River, Yuma, and Casa Grande valleys.''[5]   Of the land comprising the irrigation projects in these valleys, at least 100,000 acres is good grape soil.   The heavy planting of grapes in Arizona during recent years is indicated by the large increase in vines of all ages from about 400 acres in 1920 to approximately 3,000 acres in 1925.[6]

Eastern Labrusca Second in Importance.—The *labrusca* species of grapes, popularly known as the American or eastern grape, is second in commercial importance in the United States, and is grown in practically all sections of the country.   Of the many varieties of this species of grapes with their thin slip-skins and their characteristic tang, perhaps the best known are the Concord, the Niagara, the Delaware, and the Catawba.   All are primarily table grapes, with, however, a considerable utilization in making both fermented and, in particular, unfermented juice.   Outside of California[7] and Arizona, these are the principal grapes grown on a commercial scale.   The two chief sections producing eastern grapes in any considerable volume may, for convenience, be designated as the Great Lakes section, comprising certain portions of New York, Pennsylvania, Ohio, and Michigan; and the central western section, which embraces rather localized areas in Iowa, Nebraska, Kansas, Missouri, Illinois, and Arkansas.

[4] For a brief discussion of grape growing in Texas, see Munson, W. B., Grape growing in Texas.   Calif. Grape Grower, 4[10]: 4–5.   October, 1923.   A general discussion of the prospects for growing *vinifera* grapes on reclaimed arid lands outside of California is given in Nougaret, R. L., Status of California grape industry, June 30, 1921.   Calif. Dept. Agr. Spec. Pub. 11: 35–38.   1921.

[5] For a brief discussion of the outlook for *vinifera* grape production in Arizona, upon which statements in this paragraph are based, see Crider, F. T., Grapes in Arizona.   California Grape Grower, 4[7]: 4.   July 1, 1923.

[6] Rough estimates of acreages based upon census data on number of vines of all ages, which were 118,000 in 1920 and 868,000 in 1925.

[7] See Bonnet, L. O., Eastern Grapes in California (California Grape Grower, 5[1]: 14.   January, 1924), concerning the adaptability of the *labrusca* type of grape to California conditions.   The California Grape Grower, 6[5]: 3.   May, 1925, reports that 18,000 Concord vines were recently planted at Paradise in Butte County.

TABLE 1

BEARING, NON-BEARING, AND TOTAL NUMBER OF GRAPEVINES IN THE UNITED STATES, BY CHIEF STATES AND SECTIONS, 1910, 1920, AND 1925

(In thousands, i.e., 000 omitted.)

| State and district | 1910 | | | | 1920 | | | | 1925 | | Total bearing and non-bearing vines in percentage of 1920 as 100 | | |
| | Bearing | Non-bearing | Total bearing and non-bearing | | Bearing | Non-bearing | Total bearing and non-bearing | | Total bearing and non-bearing | | | | |
			Number	Per cent of U.S. total			Number	Per cent of U.S. total	Number	Per cent of U.S. total	1910	1920	1925
United States, total	224,601	52,699	277,300	100.0	225,754	27,395	253,149	100.0	381,738*	100.0	110	100	150
California, total	144,098	39,526	183,624	66.2	153,195	21,389	174,584	69.0	280,639	73.5	105	100	161
Central District	70,965	23,261	94,226	34.0	95,166	18,641	113,807	45.0	190,949	50.0	83	100	168
Northern district	58,804	15,111	73,915	26.6	47,044	2,083	49,127	19.4	65,376	17.1	151	100	133
Southern district	14,030	859	14,889	5.4	10,738	637	11,375	4.5	22,471	5.9	131	100	198
Imperial Valley	299	295	594	0.2	247	28	275	0.1	1,843	0.5	216	100	670
All states but California	80,503	13,173	93,676	33.8	72,559	6,006	78,565	31.0	101,099	26.5	119	100	129
Great Lakes states	56,413	7,151	63,564	22.9	55,792	2,919	58,711	23.2	72,651	19.0	108	100	124
New York	31,802	3,802	35,604	12.8	30,678	1,389	32,067	12.7	38,874	10.2	111	100	121
Michigan	11,013	1,870	12,883	4.6	11,098	607	11,705	4.6	17,218	4.5	110	100	147
Pennsylvania	5,271	1,023	6,294	2.3	7,462	402	7,864	3.1	7,779	2.0	80	100	99
Ohio	8,327	456	8,783	3.2	6,554	521	7,075	2.8	8,780	2.3	124	100	124
Central Western states	10,877	1,741	12,618	4.6	7,303	1,180	8,483	3.3	15,963	4.2	149	100	188
Missouri	3,027	486	3,513	1.3	2,445	411	2,856	1.1	5,189	1.4	123	100	182
Arkansas	806	178	984	0.3	607	101	708	0.3	4,312	1.1	139	100	609
Illinois	2,170	288	2,458	0.9	1,643	180	1,823	0.7	2,312	0.6	135	100	128
Iowa	1,984	446	2,430	0.9	1,401	305	1,706	0.7	2,115	0.6	142	100	125
Kansas	2,880	343	3,233	1.2	1,207	183	1,390	0.5	2,035	0.5	233	100	145
All other states	13,213	4,281	17,494	6.3	9,464	1,907	11,371	4.5	12,485*	3.3	154	100	110

* Preliminary data subject to revision.

Sources of data: Bearing and non-bearing acreage for 1910 from U. S. Census Bureau, Report of 13th U. S. Census, 1910, Vol. 5, Agriculture, p. 716; and non-bearing for California districts from unpublished data of the Census Bureau. Year 1920 from Report of 14th U. S. Census, 1920, Vol. 5, Agriculture, p. 869, and Vol. 6, Agriculture, part 3, p. 357. Year 1925. United States total is a preliminary figure from the 1925 Census of Agriculture published in a mimeographed release of the U. S. Census Bureau and is subject to revision which will make necessary some revision of the percentages of the United States total by states and districts. The number of vines in "All other states" in 1925, which is a preliminary figure subject to revision, is calculated by subtracting the total of California, the "Great Lakes states," and the "Central Western states" from the United States total. Data for separate states are from pamphlets, issued from time to time by the Census Bureau, giving 1925 census figures for individual states.

Slight Commercial Importance of Muscadine Grapes.—The *rotundifolia* species of native American grape, popularly known as the Muscadine type, of which the Scuppernong is the oldest and best known variety, is of little commercial importance in the United States, and is scarcely ever grown in other countries. Recent developments in methods of using this type of grape have resulted, however, in a more widespread interest in its planting in the South Atlantic and Gulf Coast states, where there is already a considerable acreage, largely in the form of home vineyards.[8]

ACREAGE

Increase in United States and California Grape Acreage, 1920 to 1925.—The growth of the grape industry in the United States since the war is probably most accurately pictured by the increase in the number of grape vines between 1920 and 1925. According to the census, during this five-year period the number of vines of all ages in the whole country rose from 253 million to 382 million, an increase of approximately 50 per cent. Expansion was much more rapid in California than in the rest of the United States, California's increase being over 60 per cent compared with 29 per cent for all other states.[9] The number of vines reported for California in 1920 was about 175 million, compared with 281 million in 1925; and in all other states 79 million in 1920, as against 101 million in 1925. California's portion of all vines in the United States rose during this time from 69 per cent of the total to almost 75 per cent with a corresponding decline in the proportion of vines in other states.

Outstanding Importance of Grape Production in Central California.—For many years the central district of California has been the most important grape-producing section in the United States, and its proportion of the state's crop has shown a steady and rapid increase. According to our national census, about 34 per cent of the grape vines

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[8] Corbett, L. C., *et al.* Fruit and vegetable production. U. S. Department of Agriculture Yearbook, **1925**:279. 1926. The portion of this article dealing with grape production in the United States, pp. 272–284, was written by George C. Husmann. It sketches very briefly the history of grape growing in this country, showing on maps the geographical changes in production by decades from 1849 to 1919.

[9] Census data (see table 1, page 12) and estimates of the California Crop Reporting Service do not agree exactly on California's vineyard growth from 1920 to 1925. The increase in acreage as reported by the latter was approximately 70 per cent during this period against an increase in number of vines of slightly over 60 per cent according to the United States Census of Agriculture for 1925. The acreage estimates of the California Crop Reporting Service for California have been used in this bulletin except in a few unavoidable instances.

Fig. 1.—The raisin-grape industry of California centers in Fresno County in the San Joaquin Valley. Table-grape production centers in San Joaquin and Fresno, but stretches the length of the Sacramento and the San Joaquin Valley. Wine-grape acreage is the most scattered, although the bulk of it is in northern California. (Data from table 2, p. 18.)
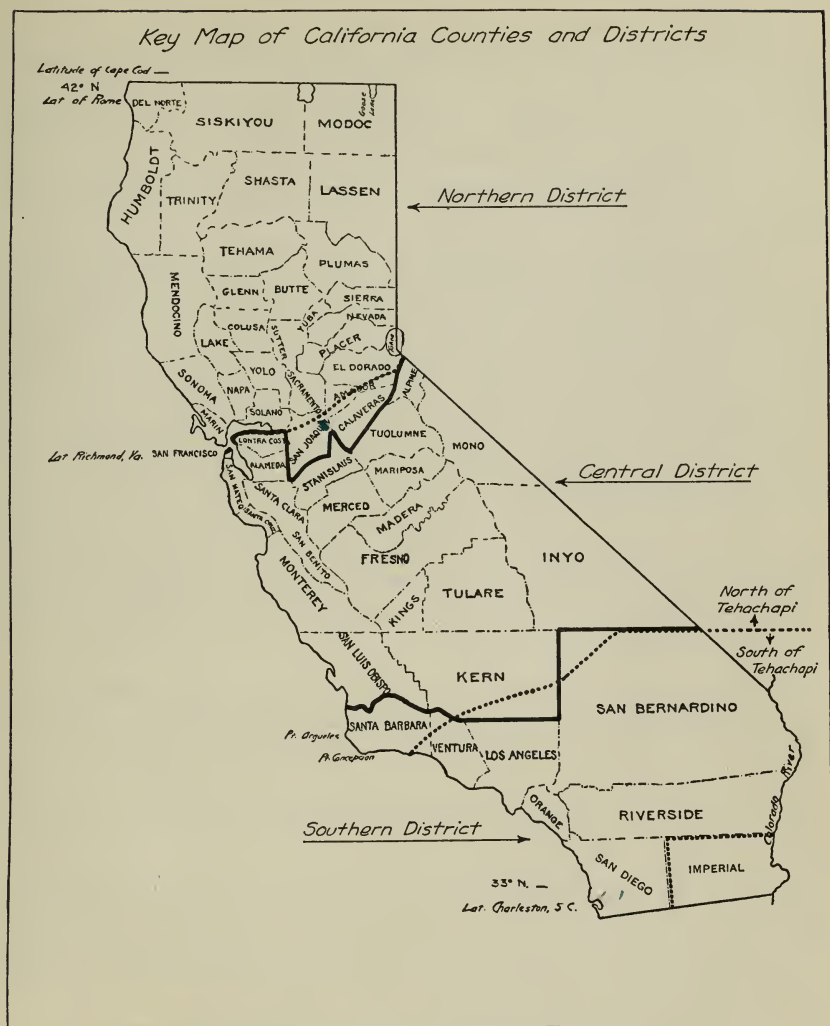
Fig. 2.—The heavy solid line indicates boundaries of districts along county lines, and the heavy dotted lines boundaries of shipping districts. The boundaries of the shipping districts are those used by the Market News Service of the United States Bureau of Agricultural Economics and conform closely to the usual divisions along county lines, except that the Bureau includes San Joaquin County shipments from south of a line running through Stockton in the central district, whereas San Joaquin County as a whole is usually included in the northern district of California when the divisions are made along county lines. The Bureau also separates the Imperial district from the rest of the southern district. The Bureau's boundary line separating the central and southern districts is the approximate line dividing the state into *north* and *south of Tehachapi* (a rugged mountain barrier separating the northern and southern part of the state except along the coast). A list of the counties in each of the districts according to county lines is given in table 2, page 18.

in the United States were in the central district in 1909. The percentage had increased to 45 by 1920, and in 1925 one-half of all the country's vines were found in this district and nearly 70 per cent of California's total acreage. In 1926 the central district contained about one-third of the wine-grape acreage of the state, over 55 per cent of the table-grape acreage and over 90 per cent of the raisin-grape acreage.[10]

Northern California Is Third in Vines but Second in Output.— The northern district of California, which has long been the chief center of the wine-grape industry of the United States, until recent years ranked second only to central California in grape production. During the decade from 1910 to 1920, however, both the output and the number of vines in this section declined appreciably, largely on account of low prices for wine, together with the growing unfavorable national attitude toward alcoholic beverages. As a result, the number of vines in the Great Lakes states has exceeded those in the northern district since some time before 1920. However, because of uniformly higher average yields per vine in northern California, both production and shipments of this district since 1918 have been consistently higher than of the Great Lakes section.

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[10] See table 2, page 18, for estimates made by the California Cooperative Crop Reporting Service and the map in figure 2 for the district boundaries used in this study. See also footnote 14, page 28, for a list of the chief varieties of grapes included in each of the three classes—wine, table, and raisin.

The boundaries of the California shipping districts employed by the Bureau are described in the mimeographed Summary of California Grapes for 1924 (U. S. Bur. Agr. Econ., 1925), as follows:

"1. (*a*) The *northern* California district extends northward from a line following the north shore of the Golden Gate, San Pablo Bay, Carquinez Straits, Suisun Bay, and then following the north shore of the San Joaquin River to Stockton, including Stockton; thence along the line of the Southern Pacific Railway to Milton, but not including that line; thence eastwardly through the center of Calaveras County; thence along the western and northern boundary lines of Alpine County to the Nevada State line.

"(*b*) Includes originations at Oakland pier and San Francisco Terminal.

"2. The *central district* of California includes the territory extending southward from the line described in paragraph 1, except Oakland Pier and San Francisco Terminal, to a southern boundary beginning at Santa Barbara along an imaginary line to Mojave and including that town; thence along an imaginary line to Mojave and including that town; thence along an imaginary line from Mojave to the western end of the Slate Range, along that range of mountains to the southern boundary of Inyo County; thence along the southern boundary of that county to the Nevada state line.

"3. The *southern district* of California extends southward from the line described in paragraph 2, taking in all the balance of the state with the exception of that portion of Imperial County south of an imaginary line running due east and west through Niland.

"4. The *Imperial district* is that portion of Imperial County south of an imaginary line through Niland, and includes the town of Niland."

The number of vines in this district declined in actual numbers from about 75 million in 1910 to 49 million in 1920 and in relative importance the number declined from approximately 26 per cent of the national total in 1910 to about 19 per cent in 1920. The stimulus given to plantings by the high prices for wine grapes in eastern markets from 1919 to 1924 has been largely responsible for the increase in the number of vines in the northern district from 49 million in 1920 to over 65 million in 1925. Expansion of acreage in the rest of the state, and particularly in central California, however, was so great during this period that the percentage of the United States total number of vines in northern California declined from 19 per cent in 1920 to 17 per cent in 1925. Somewhat less than one-fourth of the vines in California were in this district in 1925. In 1926 nearly one-half of California's wine-grape acreage, one-third of the table-grape acreage, and less than 5 per cent of the raisin-grape acreage of the state was in the northern district.

Great Lakes States Are Second in Vines but Third in Output.— Sometime between 1910 and 1920 the decreasing acreage of wine grapes in northern California led to this district losing its rank as second in number of vines and the Great Lakes states as a group taking second place. The increase in number of vines in these states since 1920 relative to the increase in northern California has been sufficient for them to maintain their position ahead of northern California in number of vines ever since 1920. The higher yield per vine in northern California, however, has enabled this district since 1909 to produce continuously a greater tonnage of grapes than his been produced in the four Great Lakes states. Shipments from the northern district of California also have been considerably larger in volume since 1918 than the movement from the Great Lakes states. In both 1909 and 1919, nearly one-fourth of the nation's grape vines were in the Great Lakes district, although the actual number declined about 5 million during this interval. Although this group of states has had an increase of about 14 million vines between 1920 and 1925, its proportion of the United States total fell to 19 per cent by 1925. This decline in percentage was caused largely by the extremely rapid increase in plantings in the central district of California.

Most Rapid Rate of Increase in Acreage Has Occurred in Southern California.—In 1925 the southern district of California, including Imperial Valley, contained something over 6 per cent of the United States total number of grape vines and less than 10 per cent of California's total number of vines. Of the state's total grape acreage in 1926, the southern district contained nearly 20 per cent of the

TABLE 2

Estimated California Grape Acreage, Bearing, Non-Bearing, and Total, by Classes, Counties, and Districts, 1926

	State rank	Wine varieties			Table varieties			Raisin varieties			Total		
		Bearing	Non-bearing	Total	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total
State total		**156,945**	**17,429**	**174,374**	**144,200**	**7,393**	**151,593**	**352,091**	**2,737**	**354,828**	**653,236**	**27,559**	**680,795**
Central district		**51,051**	**7,487**	**58,538**	**81,290**	**3,992**	**85,282**	**320,771**	**1,933**	**322,704**	**453,112**	**13,412**	**466,524**
Fresno	1	13,800	1,920	15,720	33,500	750	34,250	181,815	500	182,315	229,115	3,170	232,285
Tulare	2	1,598	398	1,996	18,675	1,341	20,016	63,242	582	63,824	83,515	2,321	85,836
Madera	5	4,425	120	4,545	4,683	15	4,698	21,325	89	21,414	30,433	224	30,657
Stanislaus	6	6,128	1,895	8,023	7,137	302	7,439	12,363	396	12,759	25,628	2,593	28,221
Merced	7	2,304	821	3,125	8,169	252	8,421	11,368	189	11,557	21,841	1,262	23,103
Kern	8	1,525	278	1,803	7,449	1,093	8,542	11,887	36	11,923	20,861	1,407	22,268
Kings	10	256	100	356	467	160	627	18,762	140	18,902	19,485	400	19,885
Santa Clara	13	9,646	616	10,262							9,646	616	10,262
Contra Costa	22	3,399	556	3,955	550		550	4		4	3,953	556	4,509
Alameda	23	3,525	510	4,035							3,525	510	4,035
Santa Cruz	26	1,500		1,500	170		170				1,670		1,670
San Benito	28	1,215	6	1,221							1,215	6	1,221
San Luis Obispo	31	670	168	838							670	168	838
Tuolumne	33	400	35	435	225	25	250	5	1	6	630	61	691
Monterey	38	230		230	80		80				310		310
Santa Barbara	39	130	29	159	105	29	134				235	58	293
Inyo	41	130		130	80	25	105				210	25	235
San Mateo	43	135	35	170							135	35	170
Mariposa	47	35		35							35		35
Northern district		**75,647**	**7,062**	**82,709**	**48,917**	**1,833**	**50,750**	**15,790**	**412**	**16,202**	**140,354**	**9,307**	**149,661**
San Joaquin	3	23,868	1,294	25,162	32,807	1,133	33,940	800		800	57,475	2,427	59,902
Sonoma	9	18,550	1,650	20,200							18,550	1,650	20,200
Sacramento	11	4,470	470	4,940	12,000	150	12,150	9		9	16,479	620	17,099
Napa	12	10,850	500	11,350							10,850	500	11,350
Sutter	14	548	455	1,003	86		86	8,531	40	8,571	9,165	495	9,660
Mendocino	15	8,000	1,050	9,050							8,000	1,050	9,050
Placer	20	3,648	109	3,757	1,566	118	1,684				5,214	227	5,441

TABLE 2—(Concluded)

	State rank	Wine varieties			Table varieties			Raisin varieties			Total		
		Bearing	Non-bearing	Total	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total	Bearing	Non-bearing	Total
Northern district (continued)......													
Yolo........	21	1,350	392	1,742	1,050	157	1,207	1,650	130	1,780	4,050	679	4,729
Yuba........	24	306		306	225		225	2,954	50	3,004	3,485	50	3,535
Solano........	25	1,555	192	1,747	239		239				1,794	192	1,986
Colusa........	27	170	45	215	190		190	1,180		1,180	1,540	45	1,585
Glenn........	29	19	139	158	284	110	394	369	157	526	672	406	1,078
Butte........	30	530	261	791	125	110	235				655	371	1,026
Tehama........	32	296	195	491	66	30	96	228		228	590	225	815
Calaveras........	34	324		324	102		102	19		19	445		445
Lake........	35	363	41	404							363	41	404
Eldorado........	36	200	134	334	54		54				254	134	388
Shasta........	37	125	55	180	60	25	85	50	35	85	235	115	350
Marin........	40	225	60	285							225	60	285
Nevada........	42	130	20	150	42		42				172	20	192
Humboldt........	45	70		70							70		70
Siskiyou........	46	15		15	21		21				36		36
Amador........	48	20		20							20		20
Lassen........	49	10		10							10		10
Trinity........	50	5		5							5		5
Southern district........		**30,247**	**2,880**	**33,127**	**13,993**	**1,568**	**15,561**	**15,530**	**392**	**15,922**	**59,770**	**4,849**	**64,610**
San Bernardino........	4	20,925	1,612	22,537	2,667	371	3,038	9,356	322	9,678	32,948	2,305	35,253
San Diego........	16	2,288	133	2,421	2,060	180	2,240	3,647	30	3,677	7,995	343	8,338
Imperial........	17				5,201	87	5,288	1,614	40	1,654	6,815	127	6,942
Los Angeles........	18	6,055	422	6,477	294	58	352				6,349	480	6,829
Riverside........	19	939	691	1,630	3,279	506	3,785	913		913	5,131	1,197	6,328
Ventura........	31				472	366	838				472	366	838
Orange........	44	40	22	62	20		20				60	22	82

wine grapes, 10 per cent of the table grapes, and slightly less than 5 per cent of the raisin grapes.   Acreage in southern California since 1920 has more than doubled, showing a greater rate of increase than either central or northern California.   Imperial Valley, the earliest producing section of California, has increased its acreage more rapidly since 1920 than any other section of the country, with the exception of Arizona.[11]   The number of vines in each of these sections was about seven times as great in 1925 as in 1920.

California Bearing Acreage by Class and County, 1926.—The only available data which can be used as an index of California's county grape output for each class of grapes are annual estimates of bearing acreage made by the California Crop Reporting Service.   Figure 3 pictures the 1926 data separately for the 20 counties which contain nearly 96 per cent of California's total of 653,000 bearing acres.   The three outstanding counties—Fresno, Tulare, and San Joaquin—contain over 55 per cent of the total state acreage of bearing vines of all varieties.   Fresno alone has 35 per cent, or 229,000 acres.   The two counties, Fresno and Tulare, contain nearly 70 per cent of the total raisin acreage.   These two, plus San Joaquin, lay claim to nearly 60 per cent of the table-grape acreage.   San Joaquin County has the largest wine-grape acreage, followed by San Bernardino, with Sonoma a close third.   Except for wine grapes, it is evident that the San Joaquin Valley is the commercial grape-producing district of California. It should be added that the rank of only two of these counties is changed, and then but slightly, if the total of both bearing and non-bearing acreage is considered instead of the bearing acreage only, which is pictured in this chart.

Washington.—Although still relatively unimportant in total output, the grape industry of Washington has expanded at a rapid rate since the war.   The number of vines doubled from 1919 to 1924, and carlot shipments, the majority of which move in September, increased from less than 40 in 1919 to over 190 in 1925.   Practically all of Washington's commercial grape output is of the *labrusca* type of eastern grape, and some of it has been pressed on a commercial scale for unfermented grape juice in the last year or so.

Most Rapid Eastern Expansion in the Ozarks.—East of the Rocky Mountains the most rapid rate of expansion in the grape industry has taken place in the group of central western states of Arkansas, Missouri, Kansas, Illinois, and Iowa.   The total number of vines in these states nearly doubled between 1920 and 1925, increasing from about

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[11] For the approximate acreage of grapes and number of vines in Arizona in 1920 and 1925 see page 11.

eight and one-half to around sixteen million. In the last three years, however, shipments have averaged over seven times the average for 1919–1921.

The most rapid expansion in acreage within this section has occurred in the Ozark Mountain region in southwestern Missouri and, particularly, in northwestern Arkansas. Grapes have been planted extensively in practically all the places in the Ozark region where

Bearing Acres of Grapes in California by Class & County, 1926.

1000 Acres	%	Rank	County
229	35.1	1	Fresno
84	12.8	2	Tulare
57	8.8	3	S.Joaquin
33	5.1	4	S.Ber'dino
30	4.7	5	Madera
26	3.9	6	Stanislaus
22	3.3	7	Merced
21	3.2	8	Kern
19	3.0	9	Kings
19	2.8	10	Sonoma
16	2.5	11	Sac'to
11	1.7	12	Napa
10	1.5	13	S.Clara
9	1.4	14	Sutter
8	1.2	15	Mendocino
8	1.2	16	S.Diego
7	1.0	17	Imperial
6	1.0	18	L.Angeles
5	0.8	19	Placer
5	0.8	20	Riverside
28	4.2	–	Others
653	100.0	–	Total

Thousands of Acres

Wine —
Raisin —
Table —

Fig. 3.—Three counties—Fresno, Tulare, and San Joaquin—contain over 55 per cent of California's bearing grape acreage. Fresno leads all counties in raisin and table-grape acreage. San Joaquin is first in wine-grape acreage and a close second in table grapes. (Data compiled from table 2, p. 18.)

strawberries have been, and are being, grown on a commercial scale. The number of vines in the state of Missouri in 1925 was nearly double that of 1920 and Arkansas' acreage multiplied six times in this five-year period. Because much of the planting in these central western states has been made since 1920, about one-half of the vineyard acreage is only a few years old at the present time.[12]

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[12] T. J. Talbert, of the University of Missouri, states that since the advent of prohibition, grape growing in Missouri and Arkansas has expanded rapidly, especially in about a dozen counties in the Ozark section of southwestern Missouri and in the region adjoining Lonetown and Altus in the Ozark section of north-

PRODUCTION

California Output Compared with that of All Other States, 1922–1925.—The fact that both production and shipments of California grapes dominate the viticultural industry of the United States is strikingly pictured in figure 5. In the four years 1922–1925, the United States produced on an average about two million tons of grapes each year. California alone produced 1.8 million tons, or

GRAPE PRODUCTION
1919

STATE	LBS	STATE	LBS
Calif	2,055,644,612	Mo	10,949,602
N.Y.	152,482,698	N.C.	10,679,108
Mich	115,871,465	Ill	10,339,018
Pa.	42,681,090	Ind	6,612,804
Ohio	41,722,796	Other	64,532,350
Iowa	12,165,318	U.S.	2,513,680,861

EACH DOT REPRESENTS
50,000 POUNDS
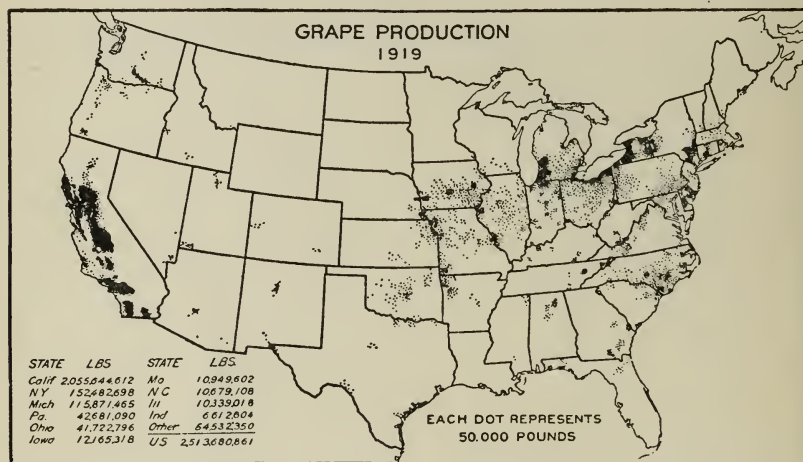
Fig. 4.—The three chief sections of commercial grape production in the United States are: (1) California; (2) the Great Lakes section, embracing certain parts of New York, Pennsylvania, Ohio, and Michigan; and (3) the Central Western section, comprising rather localized areas in Missouri, Arkansas, Illinois, Iowa, and Kansas. (Reproduced from U. S. Dept. Agriculture Yearbook 1925, p. 281.)

almost 90 per cent of this enormous total. The rest of the United States produced 235,000 tons, two-thirds of which came from the four Great Lakes states—New York, Michigan, Pennsylvania, and Ohio. Approximately one-half of California's total grape tonnage was dried

western Arkansas. Writing in the spring of 1924, he states that ''There are now more than 5,000 acres planted to grapes . . . . in southwest Missouri, but only a small part of this acreage has reached bearing age. . . . . There are only two varieties being grown commercially in the Ozark region, ... Concord and Moore's Early. Perhaps 90 per cent of the acreage is Concord.'' In the spring of 1925 he states that the established area in grapes in southwestern Missouri is at present between 7,000 and 10,000 acres. (American Fruit Growers' Magazine 44[7]: 7. July, 1924.) See also article by same author on *Grapes in Missouri* in the California Grape Grower 4[5]: 4. May 1, 1923; Cooper, J. R. (of the University of Arkansas) Grape Growing in the Ozarks, American Fruit Growers' Magazine 45[7]: 5, 11. July, 1925; and T. J. Maney, Grape Production and Distribution in Western Iowa. Iowa Agr. Exp. Sta. Bul. 199, 1921.

as raisins during the four years under consideration, which accounts
for the state's shipments of fresh grapes being smaller in proportion
to production than are shipments from the rest of the United States.
Aside from California, the Great Lakes states mentioned are the only
ones whose individual output has averaged 1 per cent or more of the
United States total crop in recent years. The annual average tonnage
shipped fresh during this period was over 890,000 tons, constituting
nearly 45 per cent of the total tonnage, on a fresh basis, produced
within the state. Fresh-grape shipments from the rest of the country
amounted to only 124,000 tons, constituting slightly less than 15 per
cent of the total carlot movement of the United States as a whole.
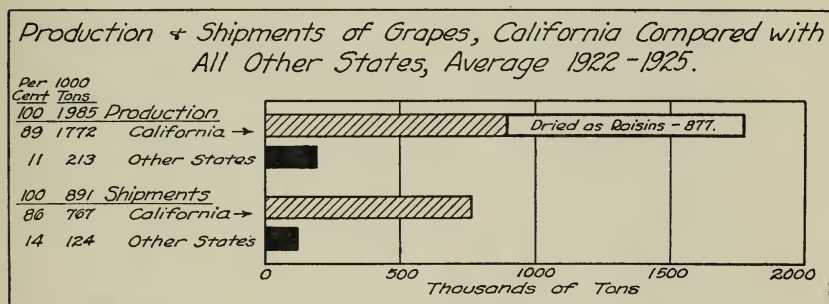
Fig. 5.—Of the United States' total production of nearly two million tons of
grapes in recent years, California has produced almost 90 per cent, drying approxi-
mately one-half for raisins. California fresh-grape shipments were over 85 per
cent of the United States movement. (Data from tables 3 and 6, pp. 24 and 38.)

California Output Much Greater Than All Other States.—The
left-hand portion of figure 6 enables one to compare both California's
total grape production and her total fresh-grape shipments with the
rest of the United States for the years 1917 through 1926. In general
it shows that California's output of grapes has never been less than
six times as great as the total production of all other states combined.
In some years it has been more than ten times as great. The relative
flatness of the curves showing production and shipments of all other
states than California, shown near the bottom of the chart, indicates
no tendency in recent years toward any noticeable increase in the
total commercial output of these states. The very evident increase
in California's production and shipments, pictured in the two upper
curves, are in marked contrast to the continued small output of the
rest of the United States.

TABLE 3

UNITED STATES PRODUCTION OF GRAPES, BY CHIEF STATES AND SECTIONS, 1909 AND 1917–1926

	1909	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926*	1924–1926 average	Per cent of U. S. total
	Production in tons												
United States, total	1,153,690	1,446,080	1,323,580	1,560,598	1,523,070	1,212,030	1,981,171	2,227,395	1,777,722	2,064,085	2,349,117	2,063,641	100.0
California, total	858,000	1,254,000	1,184,000	1,330,000	1,273,000	1,100,000	1,706,000	2,030,000	1,535,000	1,912,000	2,040,000	1,829,000	88.6
Central district	491,800			927,200						1,472,000			
Northern district	307,200			337,500						355,000			
Southern district	59,000			65,300						85,000			
All states but California	295,690	192,080	139,580	230,598	250,070	112,030	275,171	197,395	242,722	152,085	309,117	234,641	11.4
Great Lakes states	225,828	141,940	96,400	176,379	195,210	73,460	216,250	141,855	184,150	98,870	221,810	168,276	8.2
New York	126,503			76,241	85,000	33,000	105,000	62,000	80,000	51,840	106,700	79,513	3.9
Michigan	60,348			57,936			63,750	44,000	64,000	22,100	60,900	49,000	2.4
Pennsylvania	17,010			21,341			25,000	16,500	19,750	11,180	25,110	18,680	0.9
Ohio	21,967			20,861			22,500	19,355	20,400	13,750	29,100	21,083	1.0
Central Western states	27,537	17,930	14,870	20,605	20,530	13,270	24,804	21,094	21,323	20,111	42,164	27,866	1.3
Missouri	8,936			5,475			7,350	6,000	5,840	7,300	12,880	8,673	0.4
Arkansas	1,297			1,222			1,200	960	3,000	4,400	13,000	6,800	0.3
Illinois	8,291			5,170			6,370	5,494	4,900	3,360	6,532	4,931	0.2
Iowa	5,854			6,083			6,500	5,940	4,658	2,835	6,052	4,515	0.2
Kansas	3,159			2,655			3,384	2,700	2,925	2,216	3,700	2,947	0.2
All other states	42,325	32,210	28,310	33,614	34,330	25,300	34,117	34,446	37,249	33,104	45,143	38,499	1.9

* Data for 1926 are preliminary and subject to revision.

TABLE 3—(Concluded)

| | | | | Per cent of 1919–1921 average | | | | | | | | 1924–1926 average | |
	1909	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926*		Per cent of U. S. total
United States, total	**81**	**101**	**92**	**109**	**106**	**85**	**138**	**156**	**124**	**144**	**164**	**144**	....
California	70	102	96	108	103	89	138	165	124	155	165	148	....
All states but California	150	97	71	117	127	57	139	100	123	77	157	119	....
Great Lakes states	152	96	65	119	132	50	146	96	124	67	150	113	....
Central Western states	152	99	82	114	113	73	137	116	118	111	233	154	....
All other states	136	104	91	108	111	81	110	111	120	107	145	124	....

* Data for 1926 are preliminary and subject to revision.

Sources of data:

All annual totals for the United States and for groups of states are cumulated from production data for individual states. All California totals are from table 4, p. 30. California sub-totals by districts for 1925 are unpublished estimates by the California Cooperative Crop Reporting Service, and for 1909 and 1919 were calculated by applying to the state totals given herein, percentages derived from census production for the corresponding year in the counties included within each district. See table 7, p. 40, for list of counties in each district. Annual totals for all other individual states are from the following sources:

Years 1909 and 1919 from U. S. Census Bureau, Report of 13th U. S. Census 1910, Vol. 5, Agriculture, p. 716, and Report of 14th U. S. Census, 1920, Vol. 5, Agriculture, p. 869. Years 1917 and 1918 derived by applying the estimated percentage of a full or normal crop in each state to the state normals as calculated from the 1919 census production. The percentages of normal, which were furnished by the Division of Crop Estimates of the U. S. Department of Agriculture, appear in the November numbers of the Monthly Supplement of Crops and Markets or the corresponding publication the name of which has frequently changed. The process, in mathematical form, is as follows: (1919 census production÷1919 per cent of normal)×1918 per cent of normal=1918 estimated production. Estimates for individual states are not shown in this table, but only for groups of states. Years 1920 and 1921. New York figures from State of New York Dept. of Farms and Markets, Annual Report for year 1924, p. 136, 1925. Data for other states estimated in the same manner as for 1917–1918, using the percentages of a normal crop in 1919, 1920 and 1921 applied to the 1919 production as reported in the Census. Years 1922–1924 compiled from U. S. Dept. Agr. Yearbooks. Years 1924–1926 from Crops and Markets, Monthly Supplement 3:403. Dec., 1926.

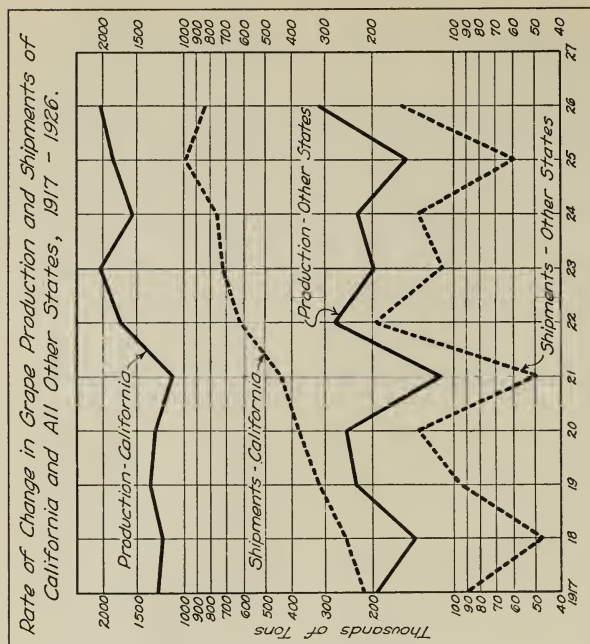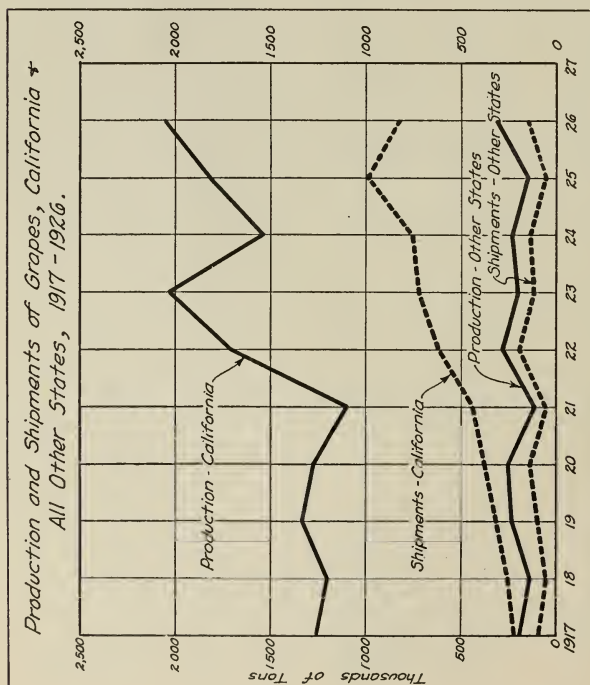All percentage data calculated from production figures shown in this table.

Fig. 6.—California's grape production and shipments have expanded rapidly since 1917. Her shipments, in particular, have increased at a rather uniform rate. Output from the rest of the United States has been relatively small, has increased but slightly, and has fluctuated violently. (Data from tables 3 and 6, pp. 24 and 38.)

Rapid Rate of California's Increase.—The right half of figure 6 pictures the comparative rate of change in grape production and shipments for both California and the rest of the United States as a whole. Exactly the same figures were used to make this portion of the chart as were used in the left half. In the right half, however, the data have been plotted on semi-logarithmic paper which has been used in order to bring out differences in percentage rates of change. The emphasis in this title should be on the words *change* and *rate*, for the chart is designed to show the relative or proportional *changes* for the whole period, and from one year to the next. The scale or equal vertical distances on the left half of the chart, as already pointed out, shows the absolute tonnage only. Equal vertical distances on the semi-logarithmic paper, although numbered as actual tons, show equal percentage changes.[13] Equal percentage increases over a series of years, when plotted on semi-logarithmic paper, are shown as a straight line. This fact is well illustrated in the right-hand curve of California grape shipments from 1917 to 1925. During this period shipments were increasing at an average rate of about 20 per cent from one year to the next. The steepness of the curve indicates the very rapid growth in the commercial movement of fresh grapes from California in the last ten years.

Violent and Frequent Changes in Eastern Yields per Acre.—For some purposes it is very important to picture as equal, the same percentage changes, regardless of the absolute amount of the change. Even though the grape output of the east is not nearly as large as California's, the violent percentage increases or decreases which frequently occur in eastern production from one year to another are a bad sign, even though the difference amounts only to 150,000 tons. With the slight increase in the bearing acreage of eastern grapes from year to year, it is obvious that an increased production of 100 per cent in a single year means that the yield per acre has doubled. Large and frequent percentage changes such as are here shown to be occurring in eastern grape production indicate that the industry is unstable. No doubt the risks and uncertainty of income, occasioned by these frequent and violent changes in yield per acre, are an important factor in explaining why grape production in most states other than California has shown but slight tendency to increase.

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[13] To illustrate: It is obvious that 200 is twice as great as 100; in other words, 200 is 100 per cent greater than 100. Likewise, 400 is twice as great as 200; or, in other words, 400 is 100 per cent greater than 200. Measuring the distance from 100 to 200 on the scale of this chart, it is found to be exactly the same as the distance from 200 to 400. Equal distances on the scale correspond to equal percentage changes, and not, as in the left hand chart, to equal differences in the absolute number of tons.

Rate of Change in California Grape Production by Classes, 1899–1926.[14]—Figure 7 pictures the rate of change in California's production of table grapes, raisin grapes, and wine grapes for the last 27 years. The curves are drawn on the semi-logarithmic scale in order to bring out differences in the rates of increase in production of the different classes of grapes. The extremely rapid rate of increase in table-grape production is shown by the steepness of the bottom curve in comparison with the other curves. Twenty-seven years ago California produced only 13,000 tons of table grapes. In 1926 her output was about 400,000 tons, or over 30 times the production of 1899.

The rate of increase in the production of raisin grapes has not been as rapid as table-grape expansion, and hence the raisin curve is not as steep as the table-grape curve. The raisin-grape production of the state was about 160,000 tons 27 years ago. It was over 1,200,000 tons in 1926. Had all the 1926 tonnage been dried, the raisin output would have been 300,000 tons, or seven and one-half times the 1899 output of 40,000 tons on a dried basis. Prior to 1915, raisin-grape production in the state was smaller than the wine-grape output, but since that date has been greater than either wine or table-grape production.

Wine grapes are the only class of grapes in the state which have not shown a steady and continuous upward trend in production throughout the entire period from 1899 to date. Political changes in regard to taxation of the wine industry and prohibition have made

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[14] The three classes of grapes—wine, table, and raisin—used throughout this bulletin are those most generally recognized in the state, and those employed by the California Cooperative Crop Reporting Service, which, when first using them stated that "the different varieties of grapes have been arbitrarily arranged by classes in accordance with their general use [for many years] rather than by considering the methods of disposal during recent seasons. That is, recognized raisin varieties such as Muscats, Thompson Seedless (Sultanina), and Sultanas are placed exclusively in the raisin-grape class whether or not the crop would be used for raisin, table, or juice purposes. Strictly wine-grape varieties are included in the wine-grape class whether or not they were shipped fresh, pressed, or made into dried grapes." (California Crop Report for 1923, Calif. Dept. Agr. Spec. Pub. 43:16. 1924.)

The chief varieties included in the *table* class are Malaga, Tokay, Emperor, and Cornichon. Thompson Seedless, Muscat, and Sultana constitute the bulk of the *raisin*-grape class. The chief varieties in the *wine*-grape class in their approximate order of commercial importance are Zinfandel, Alicante Bouschet, Carignane, Mission, Mataro, and Petite Sirah. In the fresh state the raisin grapes, particularly the Thompson Seedless variety, are used to a limited extent for table use or as *table stock*. Likewise of this class of grapes, the Muscat variety, especially, has been used on a large scale in recent years for making wine or as *juice stock*, according to the popular designation of grapes designed for, or probably converted into, wine. Table grapes, but chiefly the Malaga, are used to a considerable extent as juice stock.

the future of the industry very uncertain for the last twenty years, if not longer. Largely because of the great risks attendant upon being a political football, the wine-grape output of the state began to decrease after 1911, and at no time since has production been as large as the crop of considerably over 500,000 tons in that year.

To summarize: In the last twenty-five years California's total output of grapes increased four times; raisin grapes considerably
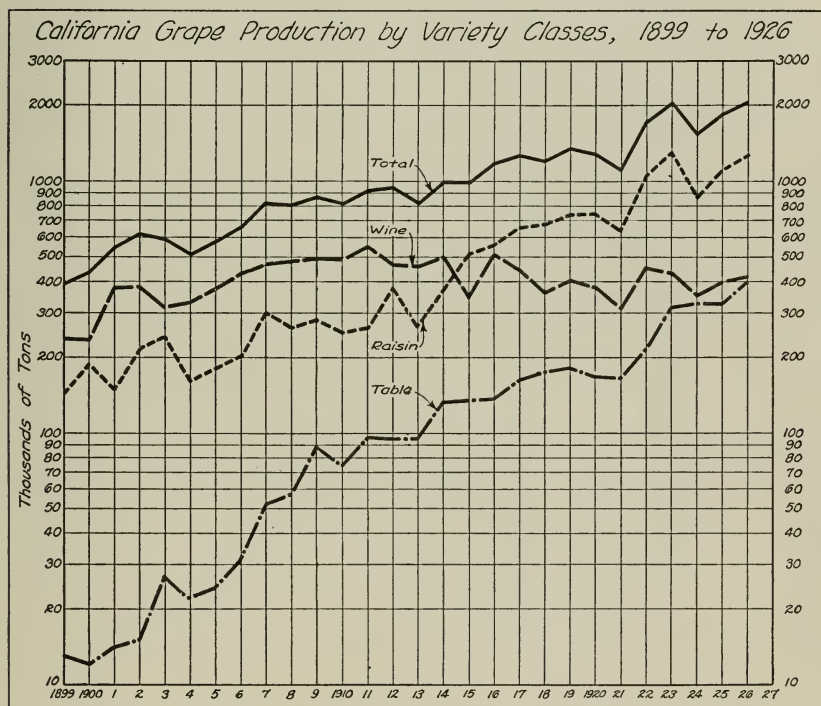
Fig. 7.—In the last twenty-five years California's total output of grapes increased four times; raisin grapes considerably more than five times; and table grapes nearly 30 times. Wine-grape production, after reaching a peak in 1911, declined until 1922, when increasing output, as the result of high post-war prices, was first felt. (Data from table 4, p. 30.)

more than five times; and table grapes nearly thirty times. Wine-grape production, after reaching a peak in 1911, declined until 1922, when increasing output, stimulated by high post-war prices, was first apparent.

Production of Chief California Districts.—An estimate of California grape production for 1925, made by the Crop Reporting Service, is the first data available since the 1919 census from which the

TABLE 4

Estimated Commercial Production of Grapes in California, by Classes, 1899–1926

Year	Production in thousands of tons (i.e., 000 omitted)				Production in percentage of 1910–1914 average				Per cent of total production		
	Wine	Table	Raisin	Total	Wine	Table	Raisin	Total	Wine	Table	Raisin
	1	2	3	4	5	6	7	8	9	10	11
1910–14 average....	491	98	304	893	100.0	100.0	100.0	100.0	55.0	11.0	34.0
1899.............................	236	13	143	392	48.0	13.2	47.0	43.9	60.2	3.3	36.5
1900.............................	232	12	189	433	47.2	12.2	62.2	48.5	53.6	2.8	43.6
1901.............................	379	14	148	541	77.2	14.2	48.7	60.6	70.0	2.6	27.4
1902.............................	380	15	216	611	77.4	15.2	71.1	68.4	62.2	2.4	35.4
1903.............................	314	27	240	581	63.9	27.4	78.9	65.1	54.1	4.6	41.3
1904.............................	328	22	160	510	66.8	22.4	52.6	57.1	64.3	4.3	31.4
1905.............................	370	24	180	574	75.3	24.4	59.2	64.3	64.4	4.2	31.4
1906.............................	423	31	200	654	86.1	31.5	65.8	73.2	64.7	4.7	30.6
1907.............................	462	52	300	814	94.1	52.8	98.7	91.2	56.8	6.4	36.8
1908.............................	478	57	260	795	97.3	57.9	85.5	89.0	60.1	7.2	32.7
1909.............................	490	88	280	858	99.8	89.4	92.1	96.1	57.1	10.3	32.6
1910.............................	489	74	250	813	99.6	75.2	82.2	91.0	60.1	9.1	30.8
1911.............................	549	96	260	905	111.8	97.6	85.5	101.3	60.7	10.6	28.7
1912.............................	462	95	380	937	94.1	96.5	125.0	104.9	49.3	10.1	40.6
1913.............................	459	95	264	818	93.4	96.5	86.8	91.6	56.1	11.6	32.3
1914.............................	497	132	364	993	101.2	134.1	119.7	111.2	50.0	13.3	36.7
1915.............................	342	134	512	988	69.6	136.2	168.4	110.6	34.6	13.6	51.8
1916.............................	507	136	528	1,171	103.2	138.2	173.7	131.1	43.3	11.6	45.1
1917.............................	441	161	652	1,254	89.8	163.6	214.5	140.4	35.2	12.8	52.0
1918.............................	343	173	668	1,184	69.8	175.8	219.7	132.6	29.0	14.6	56.4
1919.............................	400	200	730	1,330	81.4	203.3	240.1	148.9	30.1	15.0	54.9
1920.............................	375	166	732	1,273	76.3	168.7	240.8	142.6	29.5	13.0	57.5
1921.............................	310	163	627	1,100	63.1	165.7	206.2	123.2	28.2	14.8	57.0
1922.............................	450	213	1,043	1,706	91.6	216.5	343.1	191.0	26.4	12.5	61.1
1923.............................	428	312	1,290	2,030	87.1	317.1	424.3	227.3	21.1	15.4	63.5
1924.............................	350	325	860	1,535	71.3	330.3	282.9	171.9	22.8	21.2	56.0
1925.............................	395	339	1,178	1,912	80.4	344.5	387.5	214.1	20.7	17.7	61.6
1926*.............................	413	366	1,261	2,040	84.1	372.0	414.8	228.4	20.2	17.9	61.9
1927.............................											

* 1926 data are preliminary and subject to revision.

Sources of data:

Col. 1. Years 1899–1918 from table 22, page 111. Years 1919–1924 from California Cooperative Crop Reporting Service, California Crop Report for 1925. Calif. Dept. Agr. Spec. Pub. **63**:27. 1926. Years 1925–1926 from California Cooperative Crop Reporting Service, Summary of California Annual Crop Report 1926:3 (mimeo.). Jan. 5, 1927. Unharvested grapes are not included in these estimates. Total production including unharvested grapes are given in table 5, page 34, by classes 1919–1926.

Col. 2. Years 1899–1918 calculated by subtracting from the annual interstate shipments of all grapes from north of Tehachapi, increased by 25 per cent (to include estimated shipments from south of Tehachapi and total estimated consumption within the state) the annual total interstate shipments of wine grapes from the whole state for the years 1915–1918. These adjusted shipments in carloads were converted to approximate tonnage on the basis of 12 tons net per loaded car.

Years 1919–1924 from California Crop Report for 1925, p. 27. Years 1925–1926 from mimeographed Summary of California Annual Crop Report for 1926, p. 3. Data for 1926 are preliminary estimates.

Col. 3. Years 1899–1912 from California Fruit News. Dec. 29, 1917, p. 10. Years 1913–1918 from Associated Grower **5**¹:16, Jan., 1923. Years 1919–1924 from California Crop Report for 1925, p. 26. Years 1925–1926 from mimeographed Summary of California Annual Crop Report for 1926, p. 3. Data on raisins are converted to a fresh basis by using one ton of dried raisins as the equivalent of four tons of fresh fruit. Data from 1920 to date also include raisin grapes consumed in fresh form.

approximate output of each of the three districts of California can be segregated. Production in the eastern states was abnormally small in 1925, and as a result California's grape output was over 92 per cent of the United States total, compared with an average of about 88 per cent for the last three years. California's 1925 crop, however, was not abnormal in size, and hence the estimates of California's production by districts in 1925 help to visualize the typical relative output of the three districts in recent years. The central district, with 50 per cent of the United States vines in that year, produced approximately 70 per cent of the national grape crop. The northern district, with about 17 per cent of the country's total acreage, produced 18 per cent of the crop, while southern California, from 6 per cent of the vines in the United States, produced slightly over 4 per cent of the national output.

The striking fact brought out by these figures is that the central and the northern district each normally produce more grapes than the rest of the United States combined. Even the production of the southern district, although less than 5 per cent of California's total output of grapes, is somewhat greater than that of New York, the most important grape-producing state except California. The 1925 output of the northern district—which is fairly typical of the last three years—was considerably more than double the average grape production for all states but California for the period 1924–1926, and about 3.6 times the size of the Great Lakes states' crop during the same period. The enormous production of the central district—which, with the exception of San Joaquin County, is almost synonymous with the San Joaquin Valley—is brought out by the fact that its 1925 output was nearly four times as great as that of the northern district.

PRODUCTION FORECAST FOR CALIFORNIA

Figure 8 was prepared to help visualize California's probable future production of each of the three classes of grapes. The basic data on acreage were taken from the California Crop Reports and converted from bearing acres of varying ages into approximate full-bearing age. In calculating the full-bearing acreages which are plotted in this chart, table and raisin-grape vines were considered as full bearing at five years of age and older, and wine-grape vines at six years of age and older. Production data include estimates of total production, unharvested as well as harvested, made by the Crop Reporting Service. In order to compare the figures for full-bearing

acreages with those for production in tons, both series have been converted to relatives expressed as percentages of their respective averages for the years 1919–1925.

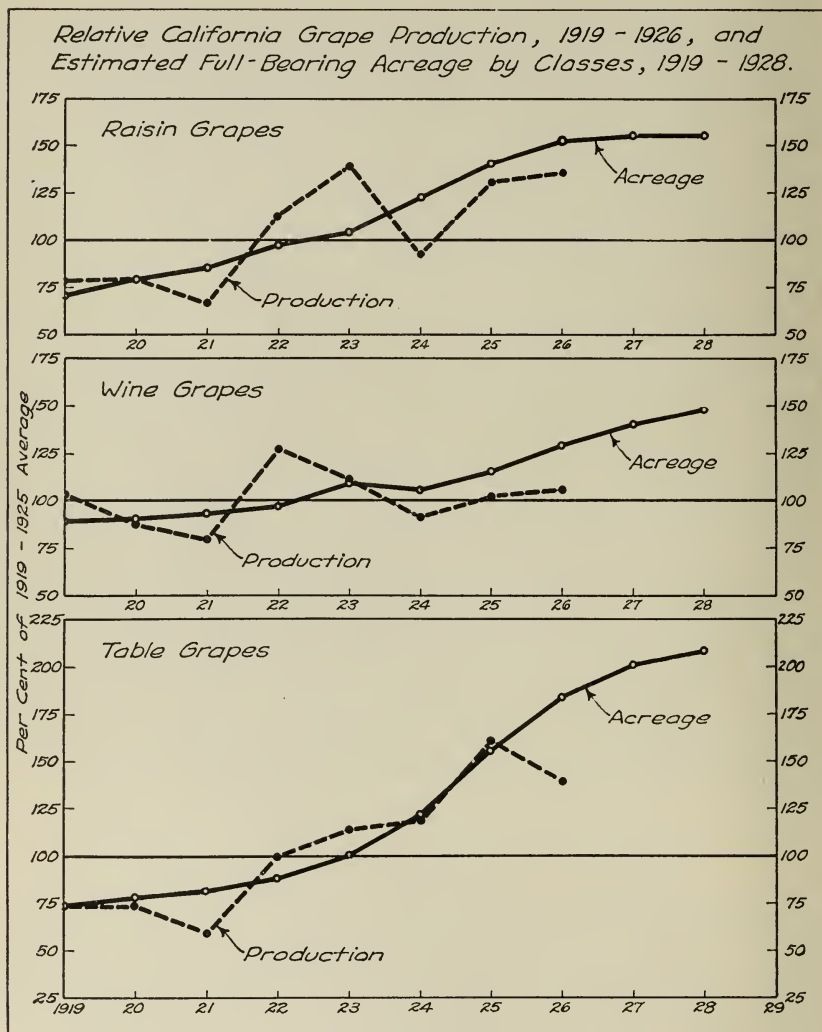Fig. 8.—Full-bearing acreage of all grapes has increased rapidly in California since 1919 and, with the exception of raisin grapes, promises to continue upward until 1928 at least. It is questionable, however, whether increases in output, particularly of raisin and of wine grapes, are likely, on the average, to keep up with increases in full-bearing acreage during the next few years. (Data from table 5, p. 34.)

If the average yield per full-bearing acre remained constant, production would tend to fluctuate above and below the curve of relative full-bearing acreage. A crop above normal in size would be above the curve of relative full-bearing acreage, whereas a crop smaller than average would be below the curve. Reliable data on yields per acre are not available for a sufficient number of years to judge whether or not there has been any definite trend in the yields per full-bearing acre of each class of grapes. Economic conditions in the grape industry in the next few years, moreover, may easily be such as to affect appreciably the care which growers give their vines, and hence the average yields per acre from the vineyards of the state. Anyone well acquainted with the grape industry can name several other factors, changes in which might affect the normal yields per acre sufficiently to make forecasts based on present yields seriously out of line with the actual results which occur. Among these factors are pests and diseases, weather conditions, methods of pruning and culture, the proportion of bearing acreage in heavy and in light-bearing varieties, or in heavy or light-bearing districts, and the amount of acreage neglected, abandoned, or grafted over.

Study of the **table-grape** curves in figure 8 shows that increases in the production of this class of grapes have been fairly consistently close to what one might expect from the trend of increase in full-bearing acreage. Apparently there has been no appreciable decline in the yield per acre since 1919, and hence production has tended to rise just about as rapidly as the estimated full-bearing acreage. Table-grape acreage has increased at a much more rapid rate than the acreage of any other class of grapes. The 1926 acreage was almost 2.5 times the 1919 acreage, and the estimate for 1928 is 2.8 times the 1919 figure. It is estimated that there were about 53,000 full-bearing acres of table grapes in the state in 1919, which number increased to about 131,000 acres in 1926, and promises to be about 147,000 acres in 1928. With anything like the average of table-grape yields per acre of the last eight years, California's production of table grapes in 1928 may well be in the neighborhood of half a million tons. Whether all of such a tremendous crop would be harvested and marketed, even if it actually matured, is questionable. Prices may be such that large quantities will be left on the vines.

The curves showing the growth of the **raisin-grape** industry indicate that its growth has not been at such a rapid *rate* as that of table grapes, and that maximum full-bearing acreage apparently will be reached in 1927. The full-bearing raisin-grape acreage was 2.1 times

TABLE 5

California Estimated Bearing and Full-Bearing Grape Acreage and Yield per Full-Bearing Acre by Classes, 1919–1928

	Wine grapes						Table grapes							Raisin grapes							Total bearing acres (000 omitted)
	Full-bearing		Production		Yield per full-bearing acre			Full-bearing		Production		Yield per full-bearing acre			Full-bearing		Production		Yield per full-bearing acre		
Year — Bearing acres (000 omitted)	Acres (000 omitted)	Per cent of 1919-25 average	Tons (000 omitted)	Per cent of 1919-25 average	Tons	Per cent of 1919-25 average	Bearing acres (000 omitted)	Acres (000 omitted)	Per cent of 1919-25 average	Tons (000 omitted)	Per cent of 1919-25 average	Tons	Per cent of 1919-25 average	Bearing acres (000 omitted)	Acres (000 omitted)	Per cent of 1919-25 average	Tons (000 omitted)	Per cent of 1919-25 average	Tons	Per cent of 1919-25 average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Average 1919-25	**112**	**109**	**100**	**387**	**100**	**3.6**	**100**	**77**	**71**	**100**	**273**	**100**	**3.8**	**100**	**239**	**223**	**100**	**928**	**100**	**4.2**	**100**	**427**
1919	97	97	89	400	103	4.1	115	55	53	74	200	73	3.8	100	170	160	72	730	79	4.6	103	322
1920	100	99	90	340	88	3.5	97	57	55	78	201	74	3.6	95	189	178	80	732	79	4.1	98	346
1921	105	102	93	310	80	3.1	85	60	58	82	163	60	2.8	73	197	190	85	627	68	3.3	79	362
1922	110	105	97	490	127	4.7	130	65	62	88	273	100	4.4	115	232	216	97	1,043	113	4.8	115	407
1923	113	119	109	428	111	3.6	101	77	71	100	312	114	4.4	115	241	232	104	1,290	139	5.6	133	434
1924	122	116	106	350	91	3.0	85	97	87	122	325	119	3.8	98	300	275	123	860	93	3.1	74	519
1925	138	126	116	395	102	3.1	87	126	110	155	439	161	4.0	105	339	312	140	12,16	131	3.9	93	602
1926*	157	141	129	413	107	2.9	82	144	131	184	381	140	2.9	76	352	339	152	1,261	136	3.7	89	653
1927*	164	151	139					148	143	201					349	346	155					661
1928*	170	162	148					148	147	208					345	345	155					663
1929																						
1930																						

* Estimates for years 1926, 1927, and 1928 are preliminary and subject to revision.

Sources of data:

Cols. 1, 8, and 15. From California Crop Report for 1925. Calif. Dept. Agr. Spec. Pub. **63:**32–33. 1926.

Cols. 2, 9, and 16. Bearing acreage (vines 3 years of age or older) converted to approximate full-bearing acreage on the assumption that wine grapes are in full-bearing at six years of age and table and raisin grapes at five years.

Cols. 4, 11, and 18. Total production including estimates of unharvested grapes. Compiled from annual numbers of the California Crop Reports, 1919–1925, and the mimeographed Summary of California Annual Crop Report for 1926.

Cols. 6, 13, and 20. Computed by dividing data in cols. 4, 11, and 18 by data for corresponding years in cols. 2, 9, and 16.

the acreage in 1919. By 1928 it will probably be almost 2.2 times the 1919 figure. The actual increases in both acreage and tonnage, however, have been enormous. The approximate full-bearing acreage, which was perhaps 160,000 in 1919, had risen to about 339,000 in 1926, and promises to be in the neighborhood of 346,000 acres in 1927 and to drop to about 345,000 acres in 1928. Relative production of raisin grapes in the last three years has not quite kept pace with the increase in full-bearing acreage. The relative decline in production, on the other hand, has not been sufficiently pronounced to support a forecast of a declining normal yield per acre for California raisin grapes. If the curve of future full-bearing acreage can be considered a good indicator of production, a normal 1928 raisin-grape crop may be slightly larger than the 1926 crop.

The rate of increase in full-bearing **wine-grape** acreage in California has been slower than the increases for both table and raisin grapes. Unlike raisin grapes, however, the trend of growth in acreage is apparently upward for the next two or three years, as is likewise the case with table-grape acreage. The estimated full-bearing acreage of wine grapes in California in 1919 was about 97,000. In 1926 it was approximately 140,000 acres, having increased around 45 per cent since 1919. By 1928 the acreage will probably be near 161,000, which will represent an increase of about 66 per cent since 1919. The production of wine grapes in the last four years has apparently not come as near keeping pace with full-bearing acreage as in the case of raisin grapes and table grapes. The average yield per acre may be declining somewhat. If this be the case, the wine-grape crop in 1928 may be a half-million tons, which it could easily be if production were to nearly parallel the estimated future full-bearing acreage.

To summarize: Full-bearing acreage of all three classes of grapes has increased rapidly since 1919. All but raisins indicate a further increase until 1929. Table-grape acreage has increased at the most rapid rate, and wine-grape acreage the least. There may be a tendency for the normal yield per acre of grapes to decline somewhat in the next few years. The tendency is not evident in table-grape production, but raisin-grape production per acre seems to indicate a slight downward trend. An apparent downward trend in the yield per full-bearing acre is more noticeable in the case of wine grapes than with raisin grapes. Production of all three classes is still on the increase, as full-bearing acreage increases.

ANNUAL SHIPMENTS

Shipments by Chief Sections of United States, 1924–1926.—Figure 9 is designed to show the relative importance of the chief commercial grape shipping sections of the United States in recent years, as far as carlot shipments are concerned. The total length of each bar shows the average annual number of carloads shipped, 1924–1926. Total United States shipments, as shown by the top bar, have averaged over 76,000 cars in recent years. Of these, California has shipped 87 per cent, or nearly 66,000 carloads. Shipments from the central district of California alone, as pictured in the third bar from the top, have
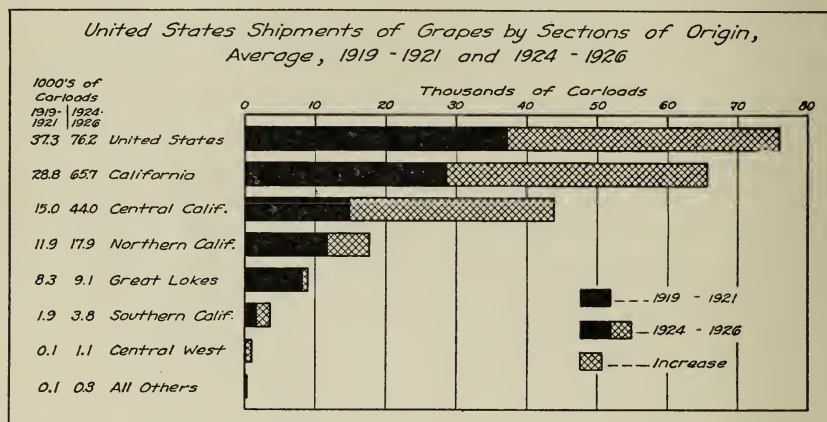
Fig. 9.—United States grape shipments doubled in the last six years, increasing from about 37,000 carloads to 76,000. Most of this increase came from California, in which state 87 per cent of the country's shipments originated in the last three years. Central California alone accounted for 58 per cent of the national movement in these three years, northern California nearly one-fourth, the Great Lakes states only one-eighth, and southern California about 5 per cent. (Data from table 6, p. 38.)

averaged 44,000 cars a year, constituting nearly 58 per cent of the total United States shipments. Northern California is next in order, the 18,000 cars from this section accounting for nearly one-fourth of the country's total shipments. The Great Lakes states of New York, Michigan, Pennsylvania, and Ohio, as a section, have shipped slightly over 9,000 cars of grapes a year from 1924 to 1926, or about one-eighth of the commercial supply of the United States. Movement from southern California during the last three years averaged nearly 3,800 cars, or about 5 per cent of the national shipments. The thousand cars which rolled from the central western district can

hardly be seen on the chart, as they constituted less than 2 per cent of the country's total. The movement from all other states is inconsequential.

Rapid Increase in United States Shipments Compared with Acreage and Production.—From 1920 to 1925, while grape acreage in the United States increased about 50 per cent, shipments increased nearly 150 per cent, but production increased only 25 or 30 per cent. The more rapid increase in shipments as compared with acreage and production is accounted for in part by the fact that the largest increase in production has come about in California, which produces considerably heavier yields per acre than in the East. Then, too, because of the extremely specialized and commercial nature of grape growing in this state, a larger percentage of our table-grape production probably has been shipped than in the East. In addition, as a result of national prohibition, much of the great increase in California shipments has been composed of grapes formerly converted into wine or raisins before leaving the state. Now most of the wine-grape production of the state, which formerly went to wineries, moves from the state by rail in a fresh state. Raisin grapes, formerly practically all dried, have moved to eastern markets in increasing quantities in a fresh state in recent years, partly as a result of the attractive prices which they brought for juice purposes for a few years and, more recently, because of the very low prices of raisins.

The growth of the grape industry, however, is not nearly as out of proportion to the increased domestic demand for grapes as a casual comparison of the increase in United States population with shipments of grapes might lead one to believe. The total population of the United States increased about 16 per cent in the last ten years, and the population of cities of 50,000 or more, which consume a large majority of California grapes, increased nearly twice as fast. Although the demand for fresh grapes at reasonably remunerative prices to growers has expanded far faster than city population in the last ten years, the extremely low level of fresh-grape prices in the last two years, and the indications of still lower prices for wine-grape varieties in the next few years, seem to indicate that the supply is now tending to outrun demand.

Increase by Chief Sections from 1920 to 1926.—Figure 9 is also designed to show the increase in average shipments between the periods 1919–1921 and 1924–1926. Total United States shipments slightly more than doubled during this period, the increase being 39,000 carloads. California alone accounted for 95 per cent of this

TABLE 6

UNITED STATES SHIPMENTS OF GRAPES, BY CHIEF STATES AND SECTIONS, SEASONS 1917–1926

	1917	1918	1919	1920	1921	1922	1923	1924	1925*	1926*	Average 1924–1926	Per cent of U.S. total
	Shipments in carlots											
United States, total	25,627	24,076	32,911	41,310	37,817	59,919	65,336	69,933	81,877	77,517	76,442	100.0
California, total	17,500	19,800	24,167	28,832	33,344	43,952	55,348	57,695	76,065	63,522	65,761	86.0
Central district			12,294	15,527	17,142	25,196	34,325	36,060	52,337	43,582	43,993	57.5
Northern district			10,095	11,315	14,328	14,351	17,223	17,971	19,603	16,444	18,006	23.6
Southern district			1,778	1,990	1,874	4,405	3,800	3,664	4,125	3,496	3,762	4.9
All states but California	8,127	4,276	8,744	12,478	4,473	15,967	9,988	12,238	5,812	13,995	10,681	14.0
Great Lakes states	7,916	4,069	8,502	12,235	4,289	15,378	9,453	11,516	4,769	11,450	9,245	12.1
New York	3,621	2,017	3,751	5,904	2,535	7,720	4,312	5,641	3,763	6,998	5,467	7.1
Michigan	3,298	1,635	3,783	5,046	1,292	6,020	4,202	4,680	398	3,008	2,695	3.5
Pennsylvania	801	367	881	1,223	390	1,558	847	1,166	589	1,355	1,037	1.4
Ohio	196	50	87	62	72	80	92	29	19	89	46	0.1
Central Western states	150	112	186	169	88	455	356	463	672	2,142	1,092	1.4
Missouri	28	21	36	27	4	128	58	101	166	708	325	0.4
Arkansas	8	9	9	14	3	38	33	243	394	1,185	607	0.8
Illinois	1				2			11	22	29	21	
Iowa	85	68	108	104	77	237	217	79	50	161	96	0.1
Kansas	28	14	33	24	2	52	48	29	40	59	43	0.1
All other states	61	95	56	74	96	134	179	259	371	403	344	0.5

TABLE 6—(*Concluded*)

	1917	1918	1919	1920	1921	1922	1923	1924	1925*	1926*	Average 1924-1926	Per cent of U. S. total
	Shipments in per cent of 1919-1921 average											
United States, total	69	65	88	111	101	160	175	187	219	208	205	
California, total	61	69	84	100	116	153	192	201	264	221	229	
Central district			82	104	114	168	229	241	349	291	294	
Northern district			85	95	120	121	145	151	165	138	151	
Southern district			95	106	100	234	202	195	219	186	200	
All states but California	95	50	102	146	52	186	117	143	68	163	125	
Great Lakes states	95	49	102	147	51	184	113	138	57	137	111	
Central Western states	101	76	126	114	60	307	241	313	454	1,447	738	
All other states	81	127	75	99	128	179	239	345	495	537	459	

* Data for 1925 and 1926 are preliminary and subject to revision.

Sources of data: Years 1917-1918: total United States shipments are cumulated from data for individual states and groups of states. California figures are approximate only, representing an average of two separate estimates: (1) interstate shipments from north of Tehachapi increased by 20 per cent and (2) total interstate shipments increased by 10 per cent; data (*a*) from table 10, page 60 and (*b*) from Nougaret, R. L., Status of the California grape industry, June 30, 1922. California Dept. Agr., Spec. Pub. **28**:16. 1922. Data for other states from Weather, Crops, and Markets **2**:467. Nov. 25, 1922. Year 1919: United States total is cumulated from individual figures subjoined. The California shipments, total and by districts, are from an unpublished revision of the U. S. Bur. of Agr. Econ., by counties and shipping points. The sub-totals by districts were compiled according to the boundaries now used by the U. S. Bur. Agr. Econ., as described in Schultz, C. E., Summary of California Grapes, Season 1924-1 (mimeo.), July, 1925, and in its California Grape Deal, 1925 Season:59 (mimeo.), July, 1926. The only exception made is that all shipments billed from Stockton are included in the northern district. Data for other states from Crops and Markets, Monthly Supplement, Nov., 1924, p. 383. Years 1920-1923: United States totals are from unpublished mimeographed revisions of monthly carlot shipments of grapes, by states, furnished by U. S. Bur. Agr. Econ. California totals are from the same source. California district figures are compiled in the same manner as those for 1919 from U. S. Dept. Agr. Stat. Bul. **8**:37-41. All other figures are also from Stat. Bul. **8**. Year 1924: All data, except California district figures, are from U. S. Bur. Agr. Econ., unpublished mimeographed revisions. California district totals are compiled on the same basis as for previous years; data from California Grape Deal, 1925 Season, pp. 53-56. Years 1925-1926: All data compiled from U. S. Bur. Agr. Econ., Weekly Summary of Carlot Shipments (mimeo.). The summary for Feb. 8, 1927, is the last issue consulted for revisions. Carlots, as stated for each year, include shipments for the entire season, from June through February of the following calendar year.

TABLE 7

CALIFORNIA SHIPMENTS OF GRAPES, BY COUNTIES AND DISTRICTS, 1919–1926

	State rank, average 1924–26	1919	1920	1921	1922	1923	1924	1925*	1926*	Average 1919–1921		Average 1924–1926	
					Shipments, in carlots					Shipments	Per cent of state total	Shipments	Per cent of state total
State total		24,167	28,832	33,344	43,952	55,348	57,695	75,899	64,330	28,781	100.0	65,975	100.0
Central district													
Fresno	1	11,845	14,634	16,231	24,114	33,051	34,916	50,132	41,508	14,237	49.5	42,186	63.9
Tulare	3	6,038	7,739	8,448	12,632	17,516	17,527	24,806	18,405	7,408	25.7	20,246	30.7
Stanislaus	4	2,185	2,928	3,569	4,598	6,013	6,094	8,842	7,520	2,894	10.1	7,485	11.4
Kern	5	1,154	1,313	1,099	1,899	2,350	2,837	4,309	4,404	1,189	4.1	3,850	5.8
Kings	6	32	89	129	218	1,088	2,532	3,950	3,070	83	0.3	3,184	4.8
Merced	10	1,372	1,387	1,548	2,041	2,225	2,495	3,273	3,322	1,436	5.0	3,030	4.6
Madera	11	413	424	469	727	1,033	1,253	1,719	1,816	435	1.5	1,596	2.4
Santa Clara	13	25	99	249	508	886	1,118	1,670	1,352	124	0.4	1,380	2.1
Contra Costa	16	296	384	415	837	1,137	589	788	841	365	1.3	739	1.1
Alameda	25	219	170	204	389	479	330	536	525	198	0.7	464	0.7
San Benito	26	61	29	52	171	241	70	146	177	47	0.2	131	0.2
San Luis Obispo	30	39	34	30	59	61	37	71	56	34	0.1	55	0.1
Monterey	33	9	6	0	11	19	15	9	20	5	0.0	15	0.0
Santa Cruz	35		23	13	13	2	5	8		13	0.0	4	0.0
San Francisco	39	2	6	6	11	1	9	2		4	0.0	4	0.0
Tuolumne	40		3				5					2	0.0
Inyo	43							3				1	0.0

TABLE 7—(Concluded)

	State rank, average 1924-26	Shipments, in carlots								Average 1919-1921		Average 1924-1926	
		1919	1920	1921	1922	1923	1924	1925*	1926*	Shipments	Per cent of state total	Shipments	Per cent of state total
Northern district		**10,544**	**12,208**	**15,239**	**15,433**	**18,497**	**19,115**	**21,641**	**19,308**	**12,664**	**44.0**	**20,022**	**30.4**
San Joaquin	2	7,384	8,916	11,041	9,188	11,562	11,997	13,102	11,457	9,114	31.7	12,185	18.5
Sacramento	9	1,468	1,636	1,211	1,844	1,714	2,035	2,244	1,722	1,438	5.0	2,000	3.0
Sonoma	8	333	466	1,325	1,894	1,941	1,940	2,227	1,932	708	2.5	2,033	3.1
Napa	12	304	249	575	818	1,260	1,207	1,406	1,526	376	1.3	1,380	2.1
Placer	15	510	348	360	552	534	393	707	522	406	1.4	541	0.8
Mendocino	14	84	163	229	305	400	330	752	890	159	0.6	657	1.0
Yolo	18	209	221	189	396	457	326	378	474	206	0.7	393	0.6
Sutter	24	3	24	18	56	138	375	122	42	15	0.0	180	0.3
Yuba	22	49	63	40	85	80	172	302	252	51	0.2	242	0.4
Solano	21	180	81	221	218	254	227	216	387	161	0.6	277	0.4
Colusa	27	0	13	12	36	104	42	67	47	8	0.0	52	0.1
Butte	28	15	17	9	23	18	48	59	26	14	0.0	44	0.1
Tehama	29						7	36	10			18	0.0
Eldorado	31		6	2	5	6	4	8	8	3	0.0	7	0.0
Glenn	32						6	4	3			4	0.0
Amador	36					20	3	3	2			3	0.0
Shasta	38						2	4				2	0.0
Marin	34	0	5	7	13	8		4	8	4	0.0	4	0.0
Calaveras	42					1	1					1	0.0
Southern district		**1,778**	**1,990**	**1,874**	**4,405**	**3,800**	**3,664**	**4,126**	**3,514**	**1,881**	**6.5**	**3,768**	**5.7**
San Bernardino	7	954	1,098	1,040	2,556	2,423	2,253	2,897	2,221	1,031	3.5	2,457	3.7
Riverside	17	154	175	318	318	356	401	389	469	216	0.8	420	0.6
Imperial	19	142	172	161	219	316	377	289	469	158	0.5	378	0.6
Los Angeles	20	310	267	195	873	350	326	320	188	257	0.9	278	0.4
San Diego	23	218	276	159	437	355	307	227	163	218	0.8	232	0.4
Orange	41		2	1	2			2		1	0.0	1	0.0
Ventura	37						1	2	4			2	0.0

* Data for 1925 and 1926 are preliminary and subject to revision.

Sources of data: Years 1919, 1924, and 1926 from unpublished revisions of the U. S. Bureau of Agricultural Economics. Years 1920–1923 from Carload Shipments, of Fruits and Melons from Station in the United States for the calendar years 1920–1923. U. S. Dept. Agr. Stat. Bul. 8:27–39. 1925. Year 1925 from Schultz, C. E., California Grape Deal, 1925 Season, U. S. Dept. Agr., pp. 57–66 (mimeo.). July, 1926.

enormous increase. Shipments from central California nearly tripled in the five-year period under consideration. The increase of 29,000 carloads from this section accounted for three-fourths of the country's total growth in grape shipments. The increase from northern California was about 6,000 cars, or 50 per cent. Shipments from southern California doubled, increasing from around 1,900 to approximately 3,800.
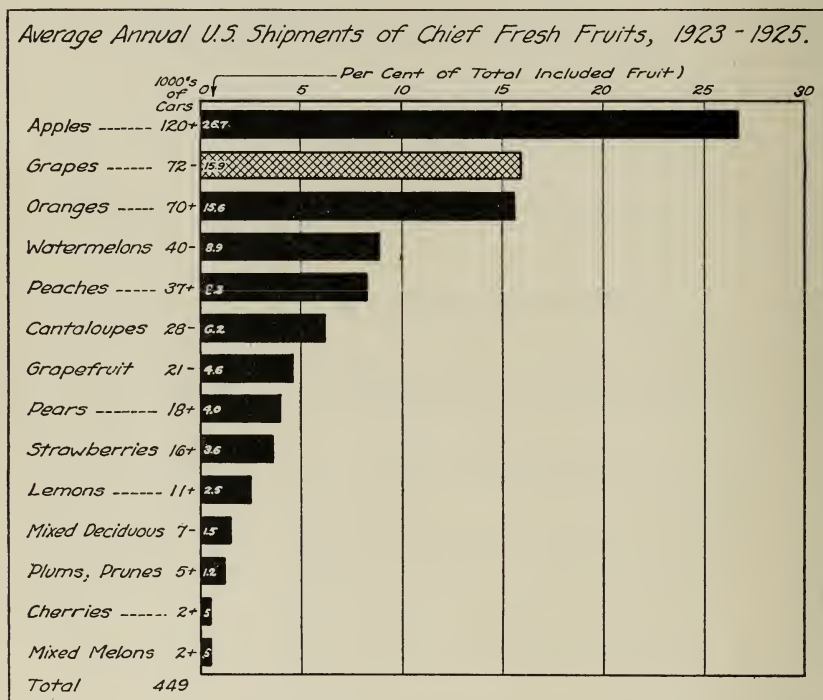

Fig. 10.—Of all United States fruit shipments, grapes have been second only to apples in recent years, accounting for nearly 16 per cent of the total movement of fruit. (Data compiled from Crops and Markets, Monthly Supplements.)

The carlot movement from the Great Lakes states expanded less than 40 per cent from 1920 to 1925. It must be remembered, however, that there has probably been a considerable increase in the use of the motor truck to haul grapes from this section to nearby markets, and hence the actual expansion in commercial movement has been greater than that indicated by the change in carlot shipments. It must not be forgotten that there is considerable commercial movement of grapes to grape-juice plants in the Great Lakes states, in which the bulk of unfermented juice produced in the United States is pressed.

The most remarkable expansion in commercial movement in recent years has occurred in the central western states, whose average annual shipments of 1,100 cars from 1924 to 1926 were over seven times the average of 150 cars a year which rolled in the period 1919–1921.

United States Grape Shipments Second to Apples.—Among the shipments of all fruits in the United States from 1923 to 1925, grapes ranked second only to apples, averaging between 15 and 16 per cent of the total carlot movement of all fruits. However, nearly as many
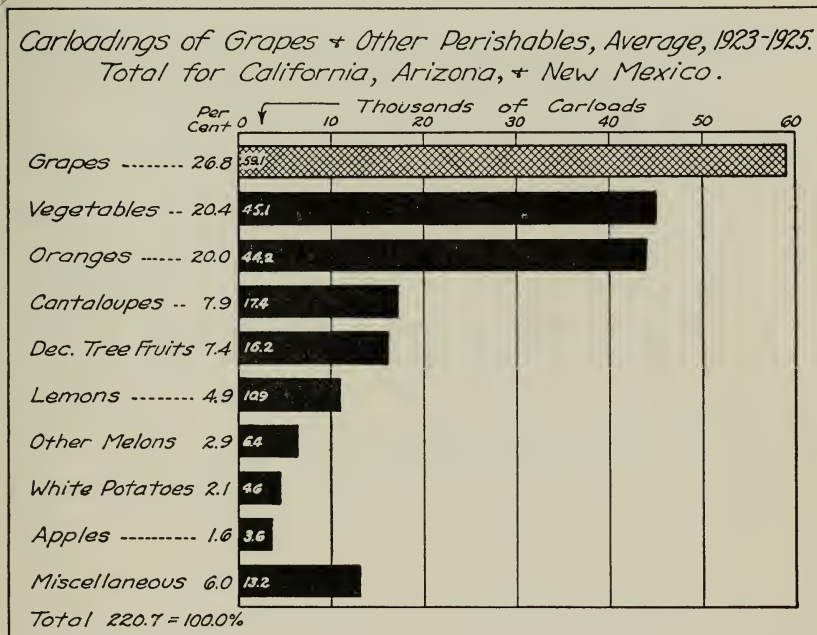
Fig. 11.—California's grape shipments have greatly exceeded those of any other fruit or vegetable in recent years, averaging 27 per cent of the total state movement of perishables.   (Data compiled from Proceedings of Pacific Coast Transportation Advisory Board.)

oranges as grapes were shipped during this period, as figure 10 shows. Previous to 1925 the volume of orange shipments was larger than that of grape shipments, but in the last two years the rapidly increasing movement of grapes has exceeded the total shipments of oranges.

Grapes First Among California's Perishables, 1923–1925.—The outstanding importance of California's grape shipments compared with the movement of other kinds of perishables from the state from 1923 to 1925 is pictured in figure 11. Grapes have constituted nearly 27 per cent of the carloadings of fresh fruits and vegetables in the

last few years. Oranges, the second fruit in volume of loadings, have accounted for 20 per cent of the state's movement of perishables, although they were exceeded slightly by carloadings of all vegetables taken as a group. How greatly California grape shipments increased relative to other perishables between 1923 and 1925 is shown by the fact that the carloadings of grapes increased from about 24 per cent of all perishables in 1923 to over 30 per cent in 1925, the year of the heaviest fresh-grape shipments ever made from California.

CALIFORNIA SHIPMENTS BY VARIETIES AND CLASSES

Total Shipments by Classes, 1925 and 1926.—California shipments of each of the three classes of grapes[15]—wine, table, and raisin—were nearly equal in 1925. According to the best available estimates 23,800 carloads of table grapes were shipped, 25,500 of wine grapes, and 26,600 of raisin grapes. (See fig. 12, p. 45, and table 8, p. 32.) Movement of fresh raisin grapes in 1925, however, was exceptionally heavy. In 1926 the state shipped about 23,900 cars of table grapes, 25,600 of wine grapes, and 14,600 of raisin grapes. Table grapes in 1925 constituted about 31 per cent of the state's total grape shipments; wine grapes nearly 34 per cent; and raisin grapes 35 per cent. In 1926, however, table grapes made up 37 per cent of the movement; wine grapes 40 per cent; and raisin grapes only about 23 per cent.

Growth in Shipments by Classes, 1919, 1925, and 1926.—The cross-hatched portions of the bars in figure 12 indicate the growth in shipments of each class and of the chief varieties of grapes between 1919 and 1925. Table-grape shipments increased 80 per cent between 1919 and 1925, while the movement of wine grapes increased 175 per cent. Shipments of both of these classes of grapes were practically the same in 1926 as in 1925. The enormous increase in raisin-grape shipments is most striking. Shipments of fresh raisin grapes in 1919 amounted to about 1,700 cars, being less than the movement of any one of the half-dozen most important table and wine-grape varieties shipped during that season. On the other hand, the 26,000 carloads of raisin grapes shipped from California in 1925 were 16 times the 1919 movement. The decline of 12,000 carloads in total shipments of California grapes from 1925 to 1926 was caused by an almost identical decrease in the volume of fresh raisin-grape shipments.

Although there are no data on California grape production by varieties, rough estimates of shipments by varieties are available for

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[15] See footnote 14, page 28, for the chief varieties included in each of the three classes of grapes under discussion here and throughout the entire bulletin.

the years 1919–1921 and for 1925 and 1926. (See table 8, p. 32.) These estimates make it possible to show, in figure 12, an approximation of the relative importance of shipments of each of the chief varieties in 1925 compared with 1919, and to depict rather roughly the increase in shipments of each since 1919 (with the exception of wine grapes, for which estimates of shipments by individual varieties are not available for 1919). The movement of fresh grapes from California in 1925, excluding the abnormally heavy shipments of raisin grapes, is probably fairly representative of the past three years.
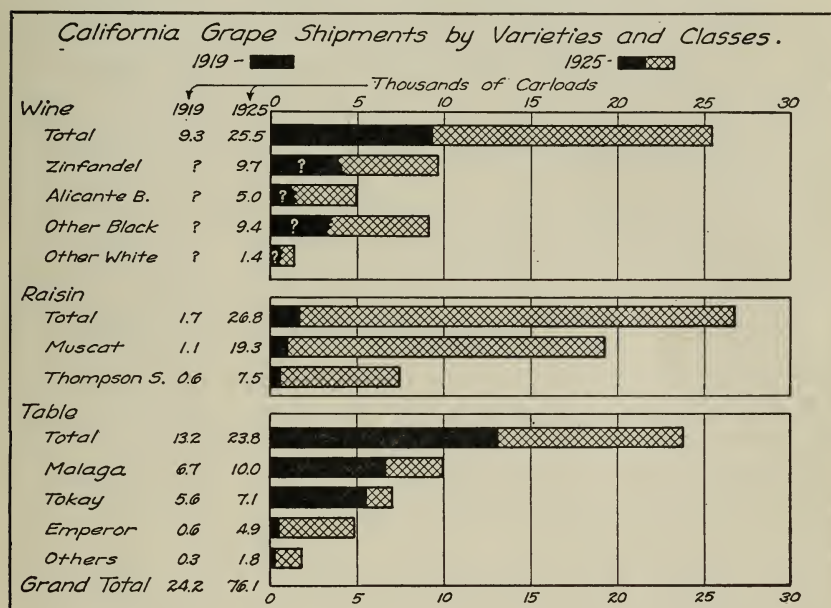

Fig. 12.—California shipments of wine and table grapes were practically equal in 1925 and only slightly larger than the unusually heavy movement of grapes. From 1919 to 1925 table-grape shipments doubled, wine grapes nearly tripled, and raisin-grape shipments increased nearly 15 times. (Data from table 8, p. 46.)

Table-Grape Shipments by Varieties, 1919 and 1925.—**Malagas** have remained first in California's carload movement of individual varieties from 1919 to date, except in 1925, when the unusually heavy shipments of Muscats put the latter in first place. Shipments of this variety in 1919, although the largest of any single variety, amounted to only 6,700 carloads. In 1925 Malaga shipments were nearly 50 per cent greater than those of 1919, and in 1926 were over 70 per cent greater. The 10,000 carloads moved in 1925 constituted about 13 per cent of California's grape shipments and 42 per cent of the movement of table varieties. Malagas were the only variety of table grapes

TABLE 8

Estimates of California Grape Shipments by Varieties and Classes, 1919–1926

1919 – 1921

Class and variety	1919				1920				1921			
	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)
Grand total	24,200		100.0	84	28,800		100.0	100	33,300		100.0	116
Wine varieties	9,300	100	38.6	74	13,000	100	44.9	104	15,200	100	45.7	121
Table varieties	13,200	100	54.4	98	13,800	100	48.0	102	13,400	100	40.3	99
Malaga	6,700	51	27.5	110	6,500	48	22.8	107	5,300	40	15.9	87
Tokay	5,600	42	23.0	108	5,600	41	19.5	108	4,500	34	13.6	87
Emperor	600	4	2.5	43	1,100	8	3.8	79	2,400	18	7.2	171
Cornichon	200	2	0.9	100	200	1	0.6	100	200	1	0.7	100
Ohanez					200	1	0.7	100	200	1	0.5	100
Others	100	1	0.5	25	200	1	0.6	100	800	6	2.4	400
Raisin varieties	1,700	100	7.0	61	2,000	100	7.1	71	4,700	100	14.0	168
Thompson Seedless	600	35	2.5	75	400	20	1.5	50	1,400	30	4.1	175
Muscat	1,100	65	4.5	55	1,600	80	5.5	80	3,300	70	9.9	165

1922 – 1924

Class and variety	1922				1923				1924			
	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)	Number of carloads (1)	Of class total (2)	Of grand total (3)	Of 1919-21 average (4)
Grand total	44,000		100.0	153	55,400		100.0	192	57,700		100.0	200
Wine varieties	19,600	100	44.6	157	21,200	100	38.3	170	18,100	100	31.4	145
Table varieties	17,500	100	39.7	130	23,000	100	41.5	170	23,600	100	40.9	175
Raisin varieties	6,900	100	15.7	246	11,200	100	20.2	400	16,000	100	27.7	572
Thompson Seedless	1,100	16	2.4	137								
Muscat	5,800	84	13.3	290								

TABLE 8—(Concluded)

Class and variety	1925*				1926*				1919–21 average			
	Number of carloads	Of class total	Of grand total	Of 1919–21 average	Number of carloads	Of class total	Of grand total	Of 1919–21 average	Number of carloads	Of class total	Of grand total	Of 1919–21 average
	1	2	3	4	1	2	3	4	1	2	3	4
Grand total	**76,100**		**100.0**	**265**	**64,100**		**100.0**	**223**	**28,800**		**100.0**	**100**
Wine varieties	**25,500**	**100**	**33.5**	**204**	**25,600**	**100**	**40.0**	**205**	**12,500**	**100**	**43.4**	**100**
Zinfandel	9,700	38	12.8		7,600	29	11.8					
Alicante Bouschet	5,000	20	6.6		7,400	29	11.7					
Other black	9,400	37	12.3		10,000	39	15.6					
Other white	1,400	5	1.8		600	3	0.9					
Table varieties	**23,800**	**100**	**31.3**	**176**	**23,900**	**100**	**37.3**	**177**	**13,500**	**100**	**46.6**	**100**
Malaga	10,000	42	13.1	164	11,500	48	18.0	189	6,100	46	21.4	100
Tokay	7,100	29	9.4	137	5,900	25	9.2	113	5,200	39	17.8	100
Emperor	4,900	21	6.4	350	4,400	18	6.8	314	1,400	10	4.6	100
Cornichon									200	2	0.7	100
Ohanez	1,800	8	2.4	225	2,100	9	3.3	262	200	1	0.7	100
Others									400	2	1.4	100
Raisin varieties	**26,800**	**100**	**35.2**	**960**	**14,600**	**100**	**22.7**	**522**	**2,800**	**100**	**10.0**	**100**
Thompson Seedless	7,300	27	9.6	911	4,200	29	6.6	525	800	29	2.9	100
Muscat	19,300	72	25.3	965	10,300	70	16.0	514	2,000	71	7.1	100
Others	200	1	0.3		100	1	0.1					

* Data for 1925 and 1926 are preliminary and subject to revision.

showing an increase in shipments in 1926 over 1925. The movement increased in 1926 to 11,500 cars, equal to 18 per cent of the state's shipments and 48 per cent of the total of table varieties.

Tokays have long stood second among the varieties making up California's table-grape shipments. The movement increased nearly 30 per cent from 1919 to 1925, rising from 5,600 carloads to 7,100, which number accounted for slightly less than 10 per cent of all shipments and nearly 30 per cent of those of table varieties. Shipments of Tokays in 1926 fell to about 5,900 carloads. Although second among table varieties, Tokay shipments in 1925 were exceeded in number, not only by Malagas, but also by Muscats, Zinfandels, and Thompson Seedless (Sultanina). In 1926, however, Tokays exceeded Thompson Seedless shipments, but were for the first time exceeded by Alicante Bouschet, which probably will continue to hold a rank above Tokays in volume of movement.

Shipments of **Emperor,** third among California table-grape varieties, increased at the most rapid rate of any of these varieties from 1919 to 1925. Shipments of 4,900 cars in 1925 were over eight times the 600 shipped in 1919 and gave Emperors a rank of sixth among all the varieties shipped that year. Approximately 4,400 carloads rolled from the state in 1926. Emperor shipments constituted slightly over 6 per cent of California's movement of all grapes in 1925 and 20 per cent of that of table varieties only. In 1926 these percentages were approximately 7 and 18.

About 1,800 cars of **other varieties** of table grapes were shipped from California in 1925 and approximately 2,100 in 1926, compared with about 300 cars in 1919. **Cornichon** is apparently the most important variety among this group.

Wine-Grape Shipments by Varieties, 1925 and 1926.—Shipments of only two varieties of wine grapes are given separately in 1925. Nearly 9,700 carloads of **Zinfandels** are estimated to have moved from the state in that year and about 5,000 cars of **Alicante Bouschet.** Zinfandels made up around 13 per cent of all grape shipments from California in 1925 and about 38 per cent of the wine grapes. Alicante Bouschet constituted slightly less than 7 per cent of the state's total shipments of all varieties during the same season and nearly 20 per cent of the wine grapes. Among wine grapes, the rank of these two varieties was probably the same in 1919 as in 1925. Records of a large part of grape sales on the eastern delivered-auction markets for the years 1924 to 1926 indicate that the production of Alicantes has probably been increasing faster since 1919 than the output of any

other variety of wine grapes. The big price differential which has prevailed since 1917 in favor of this variety has apparently resulted in a more rapid expansion in plantings of Alicante than of any other variety of wine grapes.

Shipments of **all other black varieties** of wine grapes were nearly as large as the carlot movement of Zinfandels in 1925, and probably have borne somewhat the same relation to Zinfandels for several years. Judging from available records of eastern delivered-auction sales, the chief varieties of black wine grapes making up this group are Mission, Carignane, Mataro, and Petite Sirah, in approximately the order of their importance in the last three years.

Shipments of **white wine varieties** from California have never been large. Eastern demand is almost entirely for black wine grapes, and "vineyardists who grow white wine grapes have had difficulty in disposing of their crops and many have pulled up their vines or grafted them over, where possible, to black varieties."[16]

CALIFORNIA SHIPMENTS OF JUICE STOCK AND TABLE STOCK

Rapid Increase in Shipments of Juice Stock.—As is commonly known, much of the great increase in fresh-grape shipments since the war has consisted of juice stock,[17] that is, grapes packed for, or probably used for, wine-making purposes in the home. The first available estimate of shipments of juice stock indicates that in 1921 nearly 20,000 carloads originated in California, constituting 60 per cent of the state's grape shipments in that year. From 1921 to 1925 California's shipments of juice stock increased approximately 170 per cent, while shipments of table stock increased only about 60 per cent. The estimated 54,000 cars of juice stock shipped in 1925 constituted approximately 70 per cent of the season's total movement of over 76,000 carloads. Although the number of carloads of juice stock shipped in 1926 was less than in 1925, being roughly 44,000 carloads, they constituted a slightly larger percentage of all shipments than in 1925.

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[16] Stoll, H. F. The merits of our white wine grapes. California Grape Grower, 5⁹: 8. Sept. 1, 1924.

[17] Those familiar with the marketing of California grapes will realize that an attempt to separate grape shipments into juice stock and table stock, as has been done in table 9, can, at best, result in very approximate figures only. Naturally all wine varieties are juice stock. It is known that nearly all Muscats are used for juice purposes. No one, however, probably knows with any reasonable degree of accuracy what proportion of Thompson Seedless, Malagas, and Tokays are ultimately used as juice, and what for eating.

Wine Grapes Dominate Juice Shipments.[18]—Figure 13 helps to visualize the volume of the different classes of grapes which made up juice-stock shipments in 1921 and in 1925.[19]   In both of these years wine varieties constituted a larger proportion of the total than either raisin varieties, which were second in importance, or table varieties, which held a relatively unimportant third place. Shipments of wine-grape varieties, which, in 1921, were about 15,000 cars, increased to about 25,500 carloads in 1925 and in 1926, constituting an increase of about 70 per cent. The percentage of juice stock composed of wine-grape varieties in 1921 was about 76 per cent, in 1925 only 47, and in 1926 around 58 per cent. The low percentage in 1925 was largely due to the abnormally heavy shipments of raisin grapes for juice purposes and, in small part, to the steadily increasing volume of table-grape varieties designed for juice purposes.
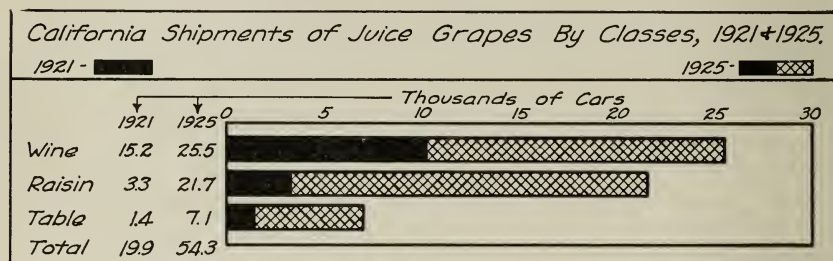
Fig. 13.—California juice-stock shipments in 1925 were about 2.7 times those of 1921. Wine grapes contribute the most juice stock, with raisin grapes second in importance. (Data from table 9, p. 54.)

Rapid Increase in Raisin-Grape Shipments Largely for Juice Purposes.—From a few cars of Thompson Seedless (Sultanina) shipped for table use in 1917, shipments of fresh raisin grapes had by 1925 increased to a maximum of over 26,000 carloads (local and interstate), constituting 35 per cent of California's total grape shipments. (See fig. 14.) Approximately 80 per cent of this great total of raisin grapes in 1925 probably was used for juice purposes. Raisin grapes constituted 40 per cent of juice-stock shipments in 1925, as compared with about 17 per cent in 1921. Shipments of fresh raisin grapes for all purposes in 1925 were over five and a half times the 4,700 carloads moved in 1921.

[18] For a discussion of shipments of wine grapes by varieties in 1925 and 1926 see page 45.

[19] Figure 13 is based upon the data in table 9 which are rough approximations only.

Shipments of the Muscat variety were larger than those of any other variety of California grapes in 1925, and the largest movement of this variety in a fresh condition that the state has ever witnessed. Probably 19,000 carloads of fresh Muscats moved in this year, making up approximately 25 per cent of all California grape shipments, or two-thirds of the fresh raisin-grape shipments. About 7,300 carloads of Thompson Seedless grapes also moved from the state in 1925, con-
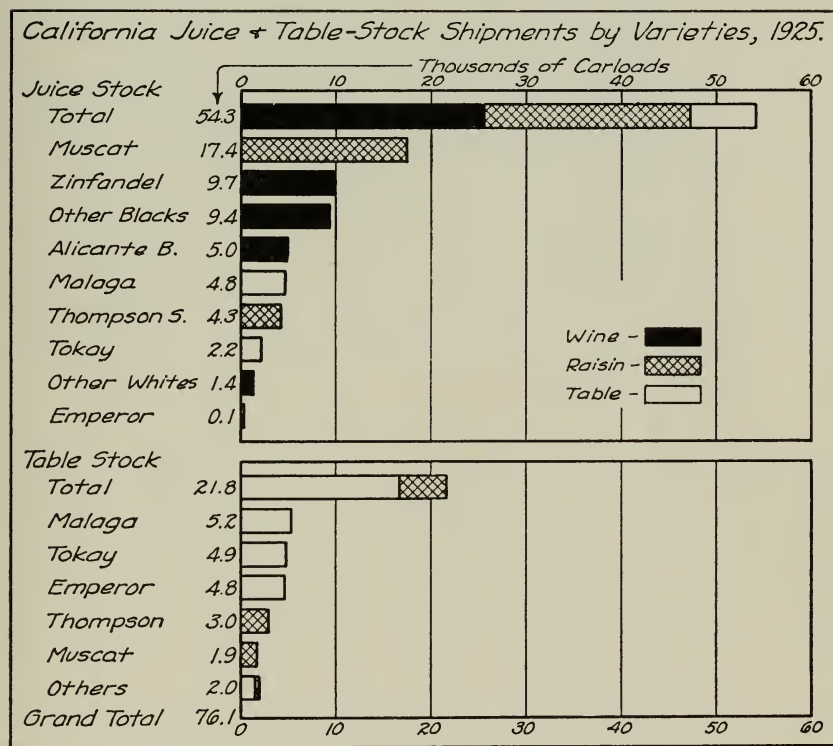
Fig. 14.—Muscat shipments were abnormally heavy in 1925, ranking first as juice stock but followed closely by the wine varieties. Other varieties accounted for only about 20 per cent of the juice-stock movement. Malagas were first among table-stock varieties but were closely followed by Tokays and Emperors. (Data from tables 8 and 9, pp. 46 and 54.)

stituting nearly 10 per cent of all grape shipments, and one-fourth of the fresh raisin-grape movement. The increase in fresh shipments of both varieties from 1919 to 1925 was enormous. Shipments of Muscats rose from about 1,100 to over 19,000 carloads, while Thompson Seedless increased from about 600 cars to 7,300 in the same period. In 1926, however, California shipped only a little over 10,000 carloads of Muscats and about 4,200 of Thompson Seedless.

The enormous movement of fresh raisin grapes in 1925, it should be noted, can not be considered representative of what should be expected one year with another. A combination of circumstances, including low prices of raisins since 1922 and a considerable demand for raisin grapes as juice stock in eastern markets for several years, led to the shipping of nearly 11,000 more cars of fresh raisin grapes in 1925 than in 1924. Judging from the disastrous effects of the oversupply of juice stock on eastern markets in 1925, it would seem that the volume of fresh raisin-grape shipments in that year may be considered as an abnormal and undesirable maximum which, no doubt, can be duplicated again, but obviously should not be unless the market demand for juice stock shows a remarkable and unexpected expansion. Estimates show that less than 15,000 carloads were shipped in 1926. The decline in fresh raisin-grape shipments in 1926 to about the same volume as in 1924 would seem to indicate that many growers consider the returns which they received or expected they might receive for raisins (dried) preferable to the returns from fresh raisin grapes shipped in 1925. An approximate basis for comparing prices for fresh raisin grapes with those for raisins (dried) is indicated in footnote number 49, page 93.

Table Varieties Are Least Important as Juice Stock but Increasing Rapidly.—Figure 14 shows that shipments of table-grape varieties as juice stock have increased considerably in recent years, the 1925 movement of about 7,100 carloads being about five times the 1,400 carloads moved in 1921, and accounting for 30 per cent of the volume of all table-grape varieties shipped, as compared with 10 per cent in 1921. The 1926 movement of these varieties as juice stock from California amounted to about 8,200 cars, or approximately 34 per cent of table varieties shipped for all purposes. In 1921 about 7 per cent of juice-stock shipments consisted of table varieties, whereas the percentage had risen to 13 in 1925, and was over 18 in 1926.

Rapid Increase in Malaga Juice-Stock Movement.—Malagas constituted nearly 65 per cent of the 1925 movement of table varieties as juice stock, and Tokays about 28 per cent. Much of the relatively rapid increase in table varieties shipped for juice purposes in recent years is accounted for by the growing proportion of the expanding Malaga production which has been shipped for this purpose in recent years. An estimated 1,000 cars of Malagas shipped as juice stock in 1921 constituted only about 20 per cent of total Malaga shipments for that year. In 1925 Malaga juice shipments of about 4,800 cars were about 48 per cent of the total Malaga movement. Malaga shipments

for juice purposes in 1926 were about 50 per cent greater than in 1925, accounting for over 60 per cent of shipments of this variety.[20]

Juice Stock by Varieties, 1925 and 1926.—Reference to figure 14 shows estimates of the number of cars of each variety of grapes shipped for juice purposes during the season of 1925. (See table 9.) Muscat shipments constituted over 30 per cent of the juice-stock movement, and Zinfandels about 18 per cent. The volume of all other black wine-grape varieties shipped in 1925 was practically the same as of Zinfandels. Alicante Bouschet shipments amounted to nearly 10 per cent of the juice stock, followed by Malagas with about 9 per cent and Thompson Seedless with eight. Only 3 per. cent of juice stock was composed of Tokays. Emperor grapes, the most of which roll after the eastern wine-making season is over, accounted for less than 1 per cent of the total juice stock.

Comparison of data for 1925 with those for 1926, as shown in table 9, brings out changes in the relative movement of the varieties making up juice stock. "Other black wine grapes" are first, Muscats second, Alicante Bouschets third, Zinfandels fourth, Malagas fifth, and Thompson Seedless sixth.

California Table-Stock Shipments by Varieties, 1925 and 1926.— The lower half of figure 14 shows approximate shipments of table stock by varieties in 1925. So few Emperors are used for juice purposes, and so large a part of Malagas, that Emperor shipments as table stock rank first, followed by Malagas, Tokays, Thompson Seedless (Sultanina), Muscats,[21] and miscellaneous varieties listed in their order of importance. These varieties held the same rank in shipments of table stock in 1926 as in 1925.

MONTHLY VARIATION IN SHIPMENTS

Purpose of Analysis.—A knowledge of the seasonal variation in movement of perishables day by day, week by week, and month by month, during each season is helpful in understanding the changing conditions of supply which affect current prices and market-distribution problems. Such data, likewise, are valuable as an aid to visualizing certain phases of the transportation problems involved in moving the enormous tonnage of grapes and other perishables from California in a few months of the year.

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[20] U. S. Bur. Agr. Econ., mimeographed Daily Market Report on California Grapes, No. 80: 5. Nov. 6, 1926. It is estimated that dried Malagas, which amounted to only 1,500 tons in 1925, rose to 10,000 tons (dried) in 1926. California Crop Report, Nov. 11, 1926: 3. (Mimeo.) 1926.

[21] There is no reliable estimate of the volume of Muscats which are consumed for table purposes in our eastern markets.

TABLE 9

Estimates of California Grape Shipments by Varieties and Classes as Table and Juice Stock, 1921, 1925, and 1926

Class, variety and use	Carloads (to nearest hundred)			Table and juice stock in percentage of class and variety totals			Per cent of grand total			Per cent of 1921	
	1921*	1925*	1926*	1921	1925	1926	1921	1925	1926	1925	1926
1	2	3	4	5	6	7	8	9	10	11	12
All varieties											
Grand total	**33,300**	**76,100**	**64,100**				**100.0**	**100.0**	**100.0**	**229**	**192**
Table stock	1,3400	21,800	19,900				40.0	28.6	31.2	163	149
Juice stock	19,900	54,300	44,200				60.0	71.4	68.8	273	222
Table varieties											
Total	**13,400**	**23,800**	**23,900**	**100**	**100**	**100**	**40.3**	**31.3**	**37.3**	**178**	**178**
Table stock	12,000	16,700	15,700	90	70	66	36.1	21.9	24.6	139	131
Juice stock	1,400	7,100	8,200	10	30	34	4.2	9.4	12.7	507	586
Malaga, total	5,300	10,000	11,500	100	100	100	15.9	13.1	18.0	187	217
Table stock	4,300	5,200	4,100	81	52	36	13.0	6.8	6.4	121	95
Juice stock	1,000	4,800	7,400	19	48	64	2.9	6.3	11.6	480	740
Tokay, total	4,500	7,100	5,900	100	100	100	13.6	9.4	9.2	158	131
Table stock	4,500	4,900	5,200	100	69	89	13.6	6.5	8.1	109	116
Juice stock	0	2,200	700	0	31	11	0.0	2.9	1.1		
Emperor, total	2,400	4,900	4,400	100	100	100	7.2	6.4	6.8	204	183
Table stock	2,400	4,800	4,300	100	97	98	7.2	6.3	6.7	200	179
Juice stock	0	100	100	0	3	2	0.0	0.1	0.1		
Others, total	1,200	1,800	2,100	100	100	100	3.6	2.4	3.3	150	175
Table stock	800	1,800	2,100	66	100	100	2.3	2.4	3.3	225	263
Juice stock	400	0	0	34	0	0	1.3	0.0	0.0		

TABLE 9—(Concluded)

Class, variety and use	Carloads (to nearest hundred)			Table and juice stock in percentage of class and variety totals			Per cent of grand total			Per cent of 1921	
	1921*	1925*	1926*	1921	1925	1926	1921	1925	1926	1925	1926
1	2	3	4	5	6	7	8	9	10	11	12
Raisin varieties.											
Total.........	**4,700**	**26,800**	**14,600**	**100**	**100**	**100**	**14.0**	**35.2**	**22.7**	**570**	**311**
Table stock...	1,400	5,100	4,200	30	19	29	4.1	6.7	6.5	364	300
Juice stock...	3,300	21,700	10,400	70	81	71	9.9	28.5	16.2	658	315
Muscat, total...	3,300	19,300	10,300	100	100	100	9.9	25.3	16.0	585	312
Table stock...	0	1,900	1,000	0	10	10	0.0	2.5	1.6		
Juice stock...	3,300	17,400	9,300	100	90	90	9.9	22.8	14.4	527	282
Thompson, total...	1,400	7,300	4,200	100	100	100	4.1	9.6	6.6	521	300
Table stock...	1,400	3,000	3,100	100	41	73	4.1	3.9	4.8	214	221
Juice stock...	0	4,300	1,100	0	59	27	0.0	5.7	1.7		
Others, total...		200	100		100	100		0.3	0.1		
Table stock...		200	100		100	100		0.3	0.1		
Juice stock...		0	0		0	0		0.0	0.0		
Wine varieties.											
Total.........	**15,200**	**25,500**	**25,600**	**100**	**100**	**100**	**45.7**	**33.5**	**40.0**	**168**	**169**
Zinfandel...		9,700	7,600		100	100		12.8	11.8		
Alicante Bouschet...		5,000	7,400		100	100		6.6	11.7		
Other black...		9,400	10,000		100	100		12.3	15.6		
Other white...		1,400	600		100	100		1.8	0.9		

Monthly United States Movement.—Of the shipments of grapes originating in the United States in the last five years, approximately 98 per cent have moved in the months of August, September, October, and November. Slightly over 80 per cent have originated in the two months of September and October, nearly 9 per cent in November, over 8 per cent in August, less than 2 per cent in June and July, and only a fraction of 1 per cent in December, January, and February. The outstanding importance of the grape shipments in Sep-
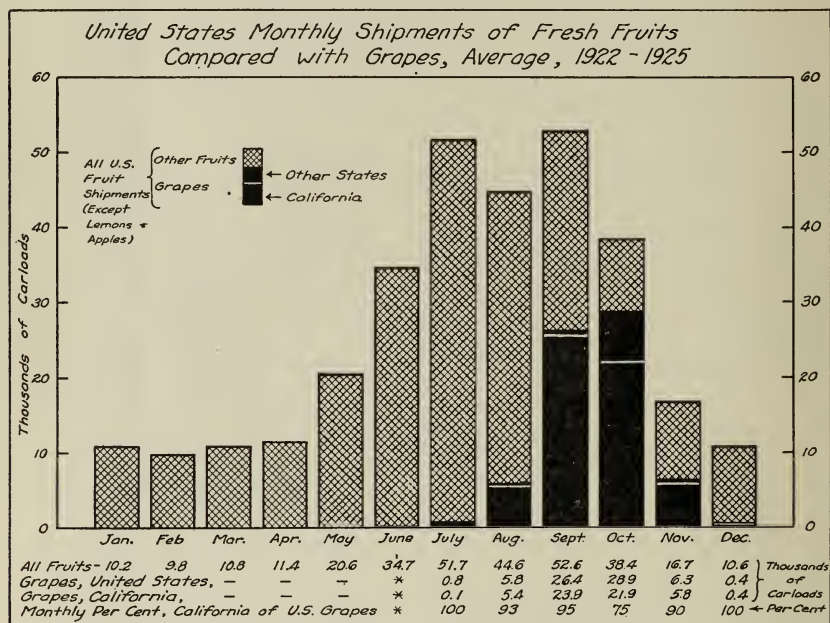
Fig. 15.—The bulk of summer fruits moves before the heavy shipments of California grapes in September and October, during which months about 65 per cent of all United States fruit shipments are grapes. (Data compiled from Crops and Markets, Monthly Supplements. Asterisk indicates less than 0.1.)

tember and October, compared with all fruit shipments (excluding apples and lemons) is shown in figure 15.[22] In the years 1922 to 1925, grapes constituted slightly over one-half of the movement of fruits originating in the United States in September, and over three-fourths of October shipments. An average of nearly 28,000 cars of grapes moved in September and almost 30,000 in the peak month of October. (See table 28, p. 125.)

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[22] Apple shipments are not included in figure 15 because of the fact that shipments of apples in these two months are not an indication of the amount that is consumed currently, as large amounts move into storage at this time. Lemon shipments are not included because they are used largely for soft drinks.

Early California and Arizona Movement, June through August.—
Since 1920 there has been a noticeable increase in early shipments of
grapes, particularly in June and July. Early Malagas and Thompson
Seedless from Arizona, and especially from the southern and central
districts of California, are responsible for practically all of this
increase. Texas, the only other state ordinarily shipping before
August first, moved only about 20 cars of early grapes in 1926. The
volume of Arizona's early shipments, although small, has increased
steadily and rapidly from less than 10 cars five years ago to somewhat
less than 70 in 1926. In recent years California has averaged about
5,900 cars of grapes for the months of June through August, com-
pared with 4,200 cars in the same months of 1920. About 90 per cent
of the June shipments of grapes, which usually begin about the middle
of the month, originated in southern California and approximately
10 per cent in Arizona.

July Shipments Come Largely from California.—Practically all
of the United States grape shipments in July originated in Califor-
nia, which shipped nearly 2,000 cars in July, 1926, compared with
less than 400 in 1920. About two-thirds of California's July ship-
ments come from the southern part of the San Joaquin Valley, in the
central district of California. Most of the remaining third originate
in southern California, which reaches its peak movement of early
grapes about the middle of July, shipments declining rapidly there-
after until they become unimportant in August. Southern California
shipments increase somewhat in September and October, but consti-
tute only 7 or 8 per cent of California's shipments during these two
months.

*Increasing August Competition Between California and Central
West.*—Early eastern grapes begin to roll toward market in August.
In recent years they have amounted to less than 10 per cent of the
United States total shipments during this month. The remainder are
California grapes, about four-fifths of which originate in the central
district and the balance largely in the northern district. Figure 16
shows that there has been a very substantial increase in August ship-
ments of grapes from north of Tehachapi in recent years. The aver-
age August movement for the five years before 1920 was about 2,400
cars, and since 1920 about 4,400 cars. However, the increase in
August shipments, at the rate of about 10 per cent each year since
1917, has been considerably less than the yearly increase of about
18 per cent for total annual shipments.

Increasing competition of Eastern producers in the early grape
markets may be expected, however, during the next few years. Most

of the grape shipments from the central western section[23] move in August and the early part of September. The steady increase in total cars originating in this district from less than 200 in 1919 to over 2,000 in 1926, together with the fact that the total acreage of grapes in this section in 1925 was approximately double that of 1920, plainly indicates the probability of much greater competition of August shipments from this section with those from California.
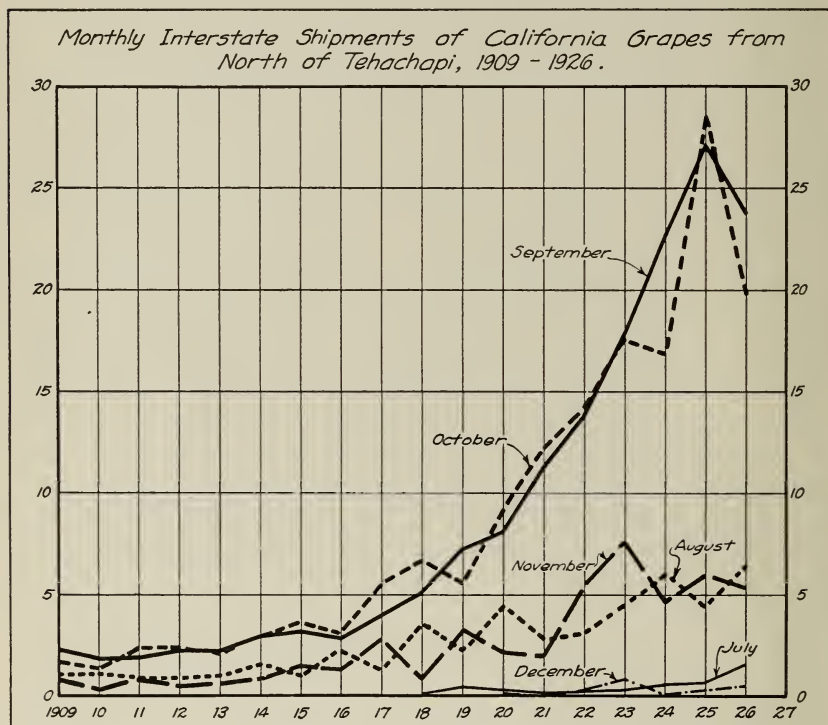
Fig. 16.—The eastern demand for juice stock, comprised chiefly of wine grapes, has caused an enormous increase, since 1916, in shipments of California grapes during the months of September and October. (Data are given in thousands of carloads and are from table 10, p. 60.)

Rapid Growth in California's September and October Shipments.— The major portion of California's large increase in grape shipments in recent years has consisted of juice stock. Shipments, accordingly, have increased most in September and October, during which months the bulk of the juice grapes ripen and the demand for wine making is greatest. Figure 16 shows the striking growth of California inter-

[23] The states which have been included in this section are Arkansas, Missouri, Iowa, Kansas, and Illinois.

state shipments from north of Tehachapi in these two months. Before 1920 shipments of grapes from this section averaged about 4,000 cars and had never exceeded 8,000 cars in either September or October. Since 1920, however, shipments in each of these months have risen to a maximum of approximately 28,500 cars in 1925, averaging 18,000 in the five years 1921–1925. The rapid increase in movement during September and October is further illustrated by the fact that the rate of increase in shipments during these two months has been about 22 per cent a year since 1917, compared with an annual increase of about 18 per cent.

The proportion of the season's total grape shipments moving in September and October, as well as the actual number of cars, has increased substantially in recent years. (See fig. 16, page 58.) Approximately 68 per cent of the season's interstate shipments moved from north of Tehachapi during these two months in the years 1913 to 1917. The rather flat curve at the bottom of figure 18, showing average weekly shipments for the years 1913 to 1917, when contrasted with the steep curve of average shipments for 1922–1925, emphasizes the enormous growth which has taken place in the commercial movement of grapes from California in recent years.

California Major and United States Secondary Peak in September.—While California's heaviest movement of grapes occurs in September, the total United States shipments during this month are usually second to the peak movement during October. In recent years, approximately 28,000 cars of grapes have originated in the United States in September, and California has supplied nearly 90 per cent of this number. Over half of California's portion has come from the central district and about one-third from the northern district. Only a very small percentage has come from the southern district. A comparison of the 1920 curves with those for 1925, in figure 17, shows that, while the movement from northern California has increased rapidly since 1920, it has been greatly exceeded by the enormous growth of shipments from the central district.

Major United States and Eastern Peak in October.—California's only serious competition with Eastern grape shipments in the past has usually occurred during October. The heaviest shipments of Eastern grapes occur in this month and California's shipments are at that time nearly as large as her peak movement in September. As a result, the total United States movement of grapes is greater in October than in any other month. In the last five years grape shipments originating outside of California in the month of October have

constituted about one-fourth of the total United States shipments, averaging nearly 4,000 cars.

Rapid Rate of Increase in California's November Shipments.— For the five-year period before 1920, November interstate grape shipments from north of Tehachapi amounted to nearly 2,000 cars per year, or about 400 cars less than the August movement. Since 1917 the November movement has increased at a rate of about 20 per cent a year. November shipments for the period 1921–1925 averaged slightly over 5,000 cars, compared with 4,200 for the month of August during the same years.

TABLE 10

California Interstate Grape Shipments from North of Tehachapi,
Annual 1895–1926, Monthly 1903–1926

Annual shipments, 1895–1902							
Year	1895	1896	1897	1898	1899	1900	1901	1902
Carlots	1,010	712	1,100	734	847	825	966	1,033

Monthly and annual shipments, 1903–1926								
Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Other	Total
1903	2	292	673	675	160	2		1,804
1904	21	372	624	369	65			1,451
1905	1	259	700	580	62			1,602
1906	2	320	907	733	90			2,052
1907	7	644	1,429	1,132	248			3,460
1908	74	420	1,480	1,511	332	2		3,819
1909	40	1,043	2,297	1,629	863	8		5,880
1910	131	1,146	1,910	1,378	379	4		4,948
1911	84	965	1,989	2,396	930	10		6,374
1912	5	978	2,339	2,422	585	28		6,357
1913	120	1,053	2,310	2,172	678	30		6,363
1914	97	1,631	3,055	3,025	952	13		8,773
1915	49	1,074	3,233	3,669	1,535	3		9,563
1916	65	2,287	2,870	3,182	1,318			9,722
1917	4	1,383	4,001	5,636	2,806	114		13,944
1918	139	3,628	5,061	6,642	888			16,358
1919	444	2,315	7,267	5,575	3,371	39	7	19,018
1920	279	4,298	8,107	9,264	2,184	133	15	24,280
1921	151	2,811	11,367	12,215	1,974	11		28,529
1922	196	3,170	13,828	14,186	5,510	241	1	37,132
1923	255	4,544	17,932	17,461	7,593	840	1	48,626
1924	574	6,055	22,731	16,840	4,597	116	23	50,936
1925	637	4,449	27,154	28,477	5,955	262	5	66,939
1926	1,542	6,378	23,752	19,801	5,331	475	16	57,295

Sources of data:

Annual totals compiled from California Fruit News for all years but 1926, data for which are from preliminary releases by the carriers. Monthly data estimated for 1903–1923 by applying to the annual totals the percentage shipped each month according to compilations of the California Fruit Distributors and for 1924–1926 compiled from data released by carriers (including minor estimates by the authors).

Except in the six-week period centering about the middle of October the California grower has, practically speaking, no competitors except other growers within the state. If, during the rest of the season, markets of the country are depressed with an enormous volume of competing supply, California shipments alone are to blame. A decrease in Eastern shipments alone, no matter how large, cannot lessen the present market supply of grapes during the rest of the season sufficiently to appreciably affect the relative profitableness or unprofitableness of shipments during, or before, this month.

Inverse Relation between August and November Shipments.—A comparison of interstate shipments north of Tehachapi in August and November, in figure 16, shows an evident tendency toward inverse correlation since 1914. In those years in which August shipments are relatively large November shipments are small, or vice versa, when August shipments are relatively light November shipments are heavy. The degree of correlation is —0.7739,[24] which indicates that during the period 1914–1926 approximately 60 per cent of the variation in November shipments can be accounted for by the variation in August shipments. The chief reason for August and November shipments moving in opposite directions is probably the fact that in early seasons the percentage of California grapes which mature and are shipped in August and also during September and October, is larger than in seasons during which the fruit matures later. Thus a smaller percentage is left to be shipped in November in early seasons. On the other hand, in years when grapes are late in maturing, a larger proportion of the crop is shipped in November. The practical importance of this relationship between August and November shipments lies in the ability to judge more accurately in August what the volume of shipments is likely to be later in the season, and particularly in November. The ability more accurately to visualize seasonal movement in advance should be of material assistance in handling marketing and transportation problems throughout the shipping season.

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[24] Calculated by the method of first differences applied to the percentages that August and November shipments were of the season's total shipments. For a description of this method see Mill, F. C., Statistical method, pp. 427–429. 1924.

WEEKLY VARIATION IN SHIPMENTS

In studying the seasonal movement of a highly perishable commodity such as grapes, it is essential to analyze weekly as well as monthly shipments. Differences in the movement in various years make it difficult to construct a single picture which is truly representative of weekly shipments in recent years. For this reason seasonal shipments for each of the last three years and for 1920 are shown separately in figure 17.

Similarity of 1924 and 1926 United States Movement.—Weekly variations in total shipments for the United States exhibit a marked similarity in movement during the two years 1924 and 1926, both of which are characterized by two peaks. The first occurs about the middle of September and is slightly lower than the second peak in the middle of October. The two are separated by a period of three or four weeks, during which time shipments are noticeably lower than in the two weeks of heaviest shipments.

Decisive Influence of California on Total Shipments.—The manner in which California's shipments have affected the total weekly movement for the United States as a whole, compared with the volume of shipments originating in all other states, can readily be seen by a study of figure 17. Shipments from the eastern states before the first of October obviously had little influence in determining the total volume of movement in these years. The United States total movement practically coincides with California's weekly volume of shipments, which constituted 98 per cent of the September peak in 1924, about 94 per cent in 1925, and 92 per cent in 1926.

Outstanding Importance of Central California.—The rough parallelism between California's total weekly movement of grapes and the volume of shipments from the central district of the state, shown in figure 17, indicates the major influence which grape shipments from this one section of the state have had upon the total movement of grapes originating in the United States in recent years. A comparison of the volume of shipments from this district in 1920 with that in each of the last three years brings out the remarkable increase which has occurred since 1920. The average annual United States shipments of grapes from 1924 to 1926 were somewhat less than double those of 1920, whereas shipments from the central district were fully three times as great. Only 30 per cent of the country's total fresh-grape shipments originated in this district in 1920, compared with 55 to 60 per cent in recent years. Raisin, table, and wine-grape shipments
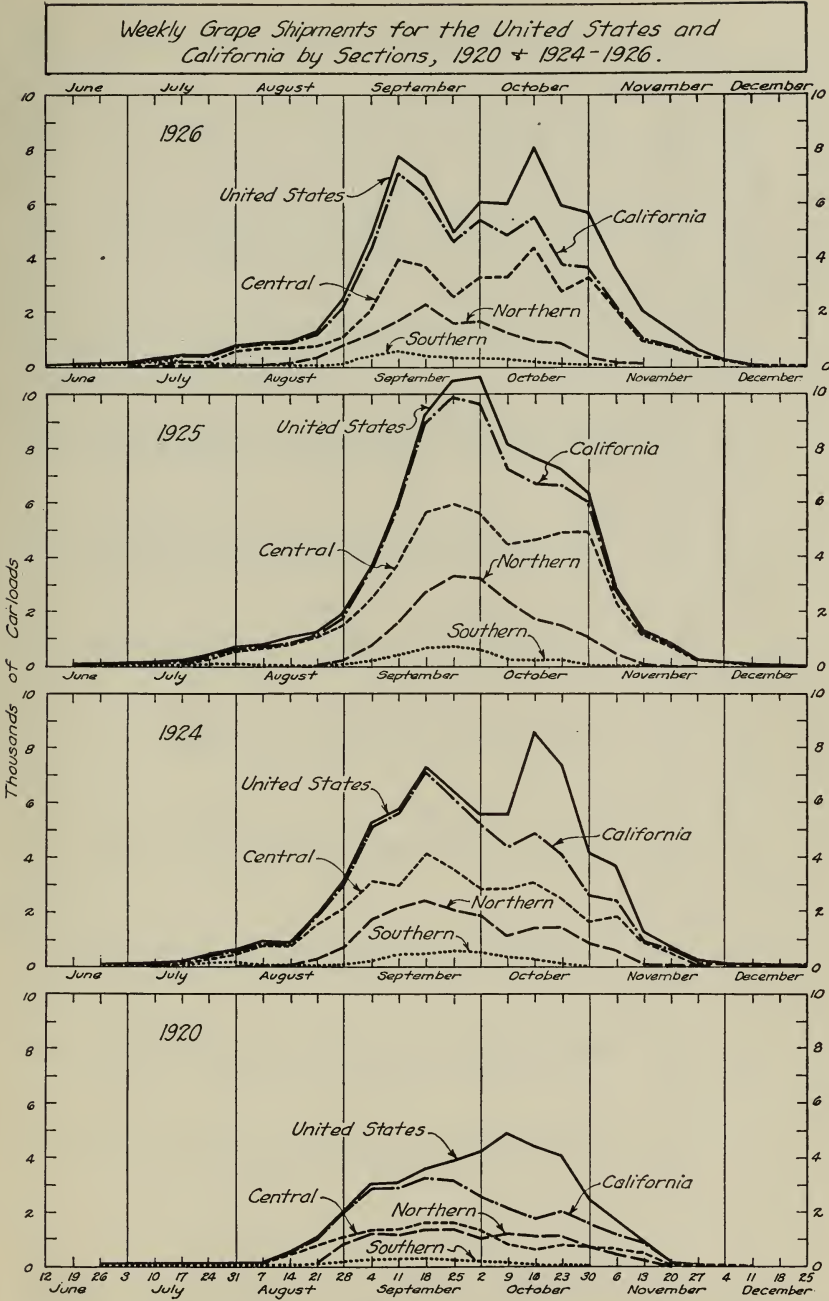
Fig. 17.—California's only serious competition with eastern grape shipments usually comes in October during the peak movement of United States shipments and the secondary peak of California shipments. (Data from table 11, p. 64.)

TABLE 11

WEEKLY GRAPE SHIPMENTS, UNITED STATES AND CALIFORNIA BY SECTIONS, 1920 AND 1924–1926

Week ending	U.S. total	California 1926*				Other states	U.S. total	California 1925*				Other states
		Total	Central	Northern	Southern			Total	Central	Northern	Southern	
Total	76,998	63,097	42,966	16,555	3,576	13,901	81,892	76,080	52,340	19,603	4,137	5,812
June 12	1	1			1							
19	17	17			17			5			5	
26	49	49			49		5	44			44	7
July 3	118	109	4	1	104	9	51	60			60	12
10	367	335	83	16	236	32	72	92			92	24
17	465	454	243	38	173	11	116	146	35		111	9
24	489	471	357	1	113	18	155	458	356		102	7
31	845	835	758	11	66	10	465	610	571		37	28
Aug. 7	925	919	882	22	15	6	638	678	676	2	2	48
14	1,002	929	775	142	12	73	726	813	813			252
21	1,415	1,332	870	446	16	83	1,065	1,107	1,050	41	16	181
28	2,829	2,423	1,336	987	100	406	1,288	1,740	1,481	211	48	198
Sept. 4	5,290	4,853	2,418	1,991	444	437	1,938	3,569	2,568	763	238	101
11	8,376	7,779	4,427	2,785	567	597	3,670	5,953	3,868	1,662	423	143
18	7,515	6,922	3,965	2,513	444	593	6,096	9,039	5,648	2,772	619	218
25	5,405	5,024	2,820	1,856	348	381	9,257	9,986	5,919	3,390	677	612
Oct. 2	6,492	5,718	3,600	1,782	336	774	10,598	9,560	5,659	3,234	667	1,046
9	6,564	5,374	3,686	1,403	285	1,190	10,606	7,311	4,541	2,478	292	908
16	8,809	6,018	4,770	1,068	180	2,791	8,219	6,732	4,653	1,815	264	954
23	6,300	4,051	3,117	880	54	2,249	7,686	6,657	4,869	1,503	285	546
30	5,612	3,925	3,526	385	14	1,687	7,203	6,042	4,804	1,127	111	349
Nov. 6	3,732	2,364	2,237	125	2	1,368	6,391	2,754	2,272	474	8	145
13	1,967	1,134	1,094	40		833	2,899	1,259	1,173	85	1	16
20	1,376	1,094	1,045	49		282	1,275	802	782	20		8
27	525	468	454	14		57	810	253	247	5	1	
Dec. 4	240	229	229			11	253	154	141	13		
11	204	201	201			3	154	131	125	2	4	
18	60	60	60				131	63	43	3	17	
25	7	7	7				63	23	20	3		
Remainder	2	2	2				23	39	26		13	
							39					

TABLE 11—(*Concluded*)

Week ending	U.S. total	California 1924				Other states	U.S. total	California 1920				Other states
		Total	Central	Northern	Southern			Total	Central	Northern	Southern	
Total........	69,933	57,697	36,827	17,206	3,664	12,236	40,517	28,644	14,424	12,271	1,949	11,873
June 26........	4	4			4		18	18			18	
July 3........	34	34			34		30	25		2	23	5
10........	112	104	10		94	8	86	84			84	2
17........	284	268	125		143	16	79	72		1	71	7
24........	495	487	318		169	8	79	70	59		11	9
31........	584	579	491	8	80	5	115	109	83	3	23	6
Aug. 7........	900	899	875	11	14	1	175	170	150	2	18	5
14........	849	829	769	59	1	20	518	515	468	12	35	3
21........	1,901	1,861	1,583	269	9	40	1,133	1,126	884	164	78	7
28........	3,144	2,947	2,197	711	39	197	1,996	1,982	1,018	806	158	14
Sept. 4........	5,268	5,158	3,165	1,760	233	110	3,008	2,889	1,393	1,270	226	119
11........	5,753	5,665	3,044	2,162	459	88	3,045	2,849	1,365	1,182	302	196
18........	7,257	7,116	4,180	2,441	495	141	3,602	3,286	1,587	1,391	308	316
25........	6,471	6,175	3,562	2,080	533	296	3,855	3,196	1,570	1,409	217	659
Oct. 2........	5,540	5,247	2,839	1,881	527	293	4,206	2,577	1,388	1,050	139	1,629
9........	5,544	4,409	2,830	1,188	391	1,135	4,864	2,175	844	1,229	102	2,689
16........	8,659	4,897	3,121	1,486	290	3,762	4,412	1,760	588	1,105	67	2,652
23........	7,389	4,099	2,505	1,478	116	3,290	4,056	2,010	812	1,151	48	2,046
30........	4,180	2,567	1,654	889	24	1,613	2,415	1,530	758	752	20	885
Nov. 6........	3,164	2,458	1,854	602	2	706	1,686	1,176	684	492		510
13........	1,276	986	895	91		290	960	846	613	233		114
20........	724	590	509	81		134	124	124	108	15	1	
27........	249	198	191	7		51	30	30	27	3		
Dec. 4........	86	65	62	2	1	21	19	19	19			
11........	26	18	16		2	8	6	6	6			
18........	18	16	15		1	2						
25........	10	9	8		1	1						
Remainder........	12	12	9		3							

* Data for 1925 and 1926 are preliminary and subject to revision.

Sources of data: Data for years 1924–1926 are all from U. S. Bureau of Agricultural Economics mimeographed compilations. Data for season 1926, which are incomplete and preliminary and hence subject to addition and revision, were compiled from the Bureau's mimeographed Weekly Summary of Carlot Shipments. Shipments after Dec. 31 are shown in table 28, p. 125. Data for 1920 taken from Nougaret, R. L. Status of California grape industry, June 30, 1921. Calif. Dept. Agr. Spec. Pub. 11:28–29. 1921. The Bureau's latest revision of shipments for the complete 1920 season through January, 1921, are 727 cars greater than the preliminary figures used in this table. These preliminary figures, however, are the only ones available for the 1920 shipments by weeks. All of San Joaquin County shipments in 1920 are included in the northern district of California, whereas only a part of this county's shipments are included in the northern district in the other years. For the boundaries of the three districts of California, according to Schultz' classification, see p. 15.

from this section have all increased enormously, a fact which is not surprising when it is remembered that central California has long been the primary center of production for Thompson Seedless, Muscats, Malagas, Tokays, and Emperors, and also the secondary center of wine-grape production.

Weekly Shipments from North of Tehachapi, 1922–1926.—Interstate shipments from north of Tehachapi have been used in figure 18 to show the typical weekly variation in California grape shipments because data for this section are the only continuous and comparable series available for the state in years before, as well as after, the war. Since shipments of grapes from south of Tehachapi are not large enough to have any appreciable effect on the weekly movement from the state except in June and July, when total shipments are very small, the weekly variation in shipments from north of Tehachapi can be considered fairly representative of the interstate movement from the whole state during the rest of the season when the large majority of the state's total grape shipments are rolled.

Practically all of the interstate shipments from north of Tehachapi normally move in the weeks which fall in the four months of August, September, October, and November. In the last five years an average of only a fraction of 1 per cent of the season's total has moved in the first and the last weeks pictured in figure 18, whereas at the peak of the shipping season from 10 to 12 per cent have rolled in a single week. The average for 1922–1926 shows a peak movement in the last week of September of about 5,400 cars, equal to slightly over 10 per cent of the annual shipments. Eastern demand for juice stock in the latter part of September and in October is largely responsible for the heavy shipments of California grapes during this part of the season. A study of table 12 will bring out the fact that the major peak of shipments from the state in recent years has varied somewhat, although it usually occurs in the second, third, or fourth week in September. After a slight recession from the heavy peak movement of the latter part of September, shipments usually decline somewhat for about a week and then rise again to a large but secondary peak about the middle of October.

Comparison of Pre-War and Post-War Shipments from North of Tehachapi.—Before the war, shipments of wine and raisin-grape varieties for juice purposes had played but little part in swelling the total of grape shipments from California. Much of the tremendous volume of shipments in September and October, 1922–1926, which are pictured in the lower half of figure 18, has been the result of the great increase in shipments of juice stock in recent years. The effect of

such shipments in swelling the percentage of grapes shipped in September and October is brought out by the curves in the upper half of the figure.
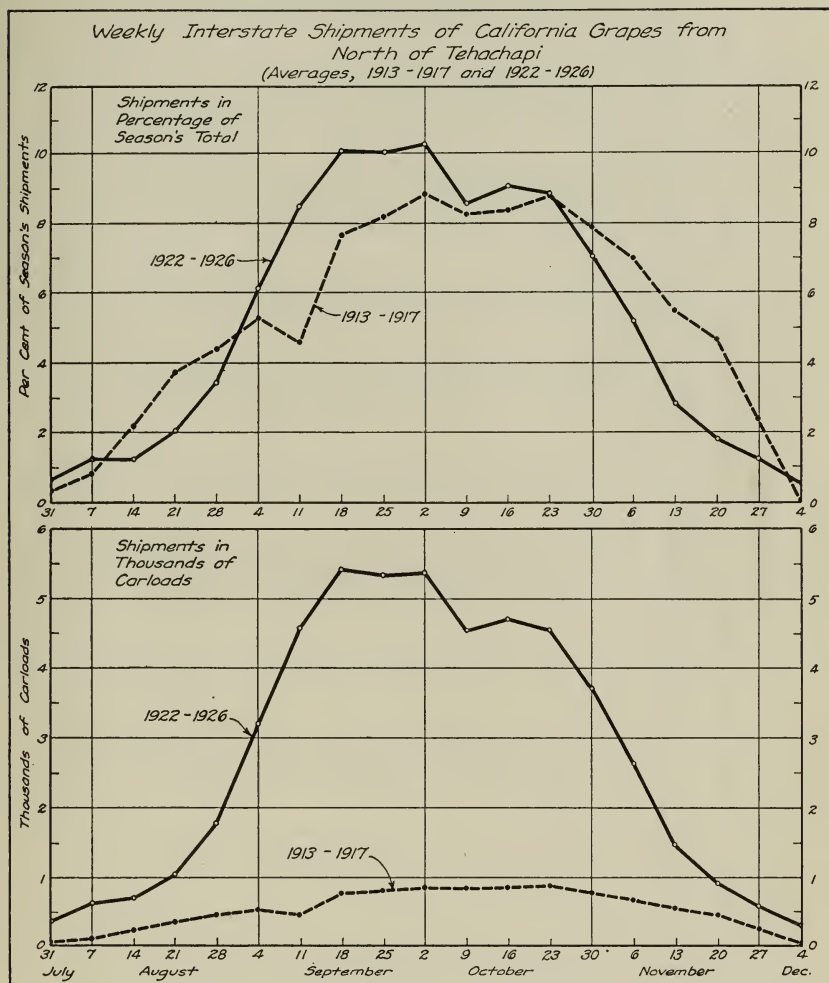
Fig. 18.—California grape shipments in the six weeks from the middle of September to the latter part of October were over six times as great in the last five years as in the years 1913–1917. Much of this tremendous increase is the result of the rapid growth in juice-stock shipments in recent years. (Data from table 12, p. 68.)

Average annual shipments of grapes from north of Tehachapi were five times as great in the last five years as in the years 1913–1917, having increased from less than 9,700 to slightly over 52,000 carloads a year. From 750 to 850 cars of grapes a week moved from California

TABLE 12

WEEKLY INTERSTATE GRAPE SHIPMENTS FROM CALIFORNIA NORTH OF TEHACHAPI, 1913–1917 AND 1922–1926

Week ending	1922 Carloads	Per cent	1923 Carloads	Per cent	1924 Carloads	Per cent	1925 Carloads	Per cent	1926 Carloads	Per cent	Average 1922–1926 Carloads	Per cent
Total	37,130	100.0	48,630	100.0	50,940	100.0	66,940	100.0	57,300	100.0	52,180	100.0
July 31	0	0.0	40	0.1	460	0.9	540	0.8	740	1.3	360	0.6
Aug. 7	350	0.9	420	0.9	820	1.6	600	0.9	860	1.5	610	1.2
14	290	0.8	630	1.3	760	1.5	740	1.1	860	1.5	660	1.2
21	390	1.1	670	1.4	1,730	3.4	1,000	1.5	1,320	2.3	1,020	2.0
28	1,070	2.9	1,040	2.2	2,800	5.5	1,610	2.4	2,290	4.0	1,760	3.4
Sept. 4	1,890	5.1	1,900	3.9	4,690	9.2	3,080	4.6	4,300	7.5	3,170	6.1
11	2,140	5.7	3,570	7.3	4,940	9.7	5,220	7.8	6,990	12.2	4,570	8.5
18	2,660	7.2	3,840	7.9	6,270	12.3	7,900	11.8	6,360	11.1	5,410	10.2
25	3,270	8.7	4,790	9.9	5,350	10.5	8,630	12.9	4,580	8.0	5,320	10.1
Oct. 2	4,080	11.1	4,840	9.9	4,480	8.8	8,300	12.4	5,210	9.1	5,380	10.3
9	3,290	8.9	3,990	8.2	3,820	7.5	6,630	9.9	4,930	8.6	4,530	8.6
16	3,780	10.2	3,660	7.5	4,380	8.6	6,090	9.1	5,670	9.9	4,720	9.1
23	4,640	12.5	4,290	8.8	3,820	7.5	5,960	8.9	3,900	6.8	4,520	8.9
30	2,780	7.5	3,920	8.1	2,450	4.8	5,560	8.3	3,840	6.7	3,710	7.1
Nov. 6	2,210	5.9	3,670	7.5	2,390	4.7	2,540	3.8	2,350	4.1	2,630	5.2
13	1,080	2.9	2,830	5.8	920	1.8	1,200	1.8	1,090	1.9	1,420	2.8
20	830	2.2	1,460	3.0	560	1.1	740	1.1	1,030	1.8	920	1.8
27	620	1.7	1,280	2.6	200	0.4	270	0.4	460	0.8	570	1.2
Dec. 4	60	0.1	870	1.8	50	0.1	130	0.2	230	0.4	270	0.5
Remainder	1,700	4.6	920	1.9	50	0.1	200	0.3	290	0.5	630	1.2

TABLE 12—(*Concluded*)

Week ending	1913 Carloads	1913 Per cent	1914 Carloads	1914 Per cent	1915 Carloads	1915 Per cent	1916 Carloads	1916 Per cent	1917 Carloads	1917 Per cent	Average 1913–1917 Carloads	Average 1913–1917 Per cent
Total	**6,360**	**100.0**	**8,770**	**100.0**	**9,560**	**100.0**	**9,720**	**100.0**	**13,940**	**100.0**	**9,680**	**100.0**
July 31	70	1.0	50	0.5	80	0.9	60	0.7	0	0.0	30	0.3
Aug. 7	140	2.2	100	1.2	180	1.8	240	2.4	30	0.2	80	0.8
14	230	3.6	340	3.8	170	1.7	570	5.8	90	0.6	210	2.2
21	280	4.4	430	4.8	260	2.8	690	7.1	340	2.4	360	3.7
28	290	4.5	350	4.0	380	4.0	640	6.6	550	4.0	430	4.4
Sept. 4	330	5.1	520	5.9	370	3.8	200	2.1	680	4.9	510	5.3
11	480	7.5	710	8.1	730	7.7	780	8.1	470	3.4	450	4.6
18	560	8.8	770	8.9	840	8.8	760	7.8	910	6.5	750	7.7
25	540	8.6	820	9.4	870	9.2	750	7.8	1,020	7.3	800	8.2
Oct. 2	560	8.9	610	6.9	920	9.6	820	8.5	1,300	9.3	820	8.9
9	480	7.6	660	7.5	840	8.6	510	5.3	1,170	8.4	810	8.3
16	510	8.0	790	9.1	870	9.2	710	7.3	1,430	10.2	820	8.4
23	520	8.1	750	8.6	870	9.2	870	8.9	1,430	10.2	850	8.8
30	450	7.2	610	6.9	790	8.2	790	8.1	1,040	7.5	770	7.9
Nov. 6	370	5.8	390	4.4	670	7.1	610	6.3	1,030	7.4	670	7.0
13	190	2.9	290	3.3	390	4.0	520	5.3	930	6.7	540	5.5
20	220	3.5	270	3.1	270	2.8	170	1.7	860	6.2	450	4.7
27	90	1.5	240	2.8	0	0.0	30	0.2	370	2.7	230	2.4
Dec. 4	30	0.5	60	0.7	0	0.0	0	0.0	0	0.0	20	0.1
Remainder	20	0.3	10	0.1	60	0.6	0	0.0	290	2.1	80	0.8

Sources of data:

The dates indicated are for weeks ending on days during the 1926 season. Actual dates as reported in former seasons vary according to the calendar, but are the nearest to the 1926 season's comparative period.

Data on carloads for 1913–1917 and 1922–1925 compiled from California Fruit News and for 1926 from preliminary releases of the carriers. Weekly carlot movement for years 1924–1926 estimated by applying to total interstate shipments for each year the percentages of shipments (local as well as interstate) that moved from both the northern and central districts of California as given in table 6, p. 38. The weekly percentages for all years but 1924–1926 computed from the carlot data as given in this table.

in the six weeks from the middle of September to the latter part of October during the period 1913–1917, averaging about 800 cars. From 1922 to 1926 the weekly movement during this period averaged nearly 5,000 cars, varying from about 4,500 cars to over 5,400 cars in the week of peak movement. In other words, average shipments during this six-week period were over six times as great from 1922 to 1926 as they were from 1913 to 1917.

Fig. 19.—Juice stock shipments of California grapes were nearly four times as great as the movement of table stock in 1925 and 1926. The rapid rise of juice-stock shipments in September and the sudden decline in October are in marked contrast to the relatively uniform movement of table stock throughout most of the shipping season. (Data for 1925 from Schultz, C. E. California Grape Deal for 1925:48, 49 (mimeo.) July, 1926; and for 1926 from U. S. Bur. Agr. Econ., Daily Market Report on California Grapes, No. 80:5 (mimeo.) Nov. 6, 1926.)

Weekly Shipments of Table and Juice Stock, 1925 and 1926.— Estimates of the weekly shipments of table grapes and of juice grapes were first shown separately for the 1925 crop. The striking difference in the weekly movement of the two kinds of grapes during most of the 1925 and 1926 seasons is shown in figure 19. Table stock moved in relatively uniform amounts during the bulk of both seasons. During the season of 1925, however, they showed a gradual increase— except for some slight ups and downs—until the peak movement of

about 1,900 cars was reached in the first week of November. In 1926 the peak of table-stock shipments came in the middle of September.

The rapid rise and sudden decline in the shipments of juice stock in September and October of both years was in sharp contrast to the relatively uniform movement of table stock during the bulk of the shipping season. The decline in 1926 during October was, however, not nearly as precipitous as in 1925. In the last week of September, 1925, at the height of the movement of juice stock, nearly 9,500 cars were shipped from the state. In 1926, the much lower peak of nearly 6,500 cars came in the middle of September and was relatively uniform for seven or eight weeks, maintaining itself longer than in 1925. The average of table-stock shipments for the fifteen weeks pictured in 1925 was less than 1,000 cars per week, whereas over 3,700 cars per week of juice stock moved during the same period. Average weekly shipments of table stock during the fourteen weeks of 1926 were less than 800 cars, compared with nearly 3,300 cars of juice stock.

TABLE 13

ESTIMATED WEEKLY CARLOAD SHIPMENTS OF CALIFORNIA GRAPES BY CLASSES, 1925 AND 1926

1925					1926				
Week ending	Total	Wine	Raisin	Table	Week ending	Total	Wine	Raisin	Table
Season's total through Nov. 13....	71,457	28,218	24,861	18,378	Season's total through Nov. 2....	58,716	27,882	14,436	16,398
Prior to Aug. 1.........	1,142	0	700	442	Prior to July 28......	1,655	11	1,109	535
Aug. 1 through Nov. 13.................	70,315	28,218	24,161	17,936	July 28 through Nov. 2.................	57,061	27,871	13,327	15,863
Aug. 7............................	662	81	198	383	Aug. 3........................	856	90	466	300
14............................	761	87	223	451	10........................	904	281	275	348
21............................	949	261	217	471	17........................	1,072	530	233	309
28............................	1,521	596	513	412	24........................	1,626	1,026	341	259
Sept. 4............................	2,852	970	1,333	549	31........................	3,178	1,956	763	459
11............................	5,064	1,637	2,458	969	Sept. 7........................	5,908	3,445	1,738	725
18............................	7,915	4,066	2,840	1,009	14........................	8,119	4,178	2,781	1,160
25............................	9,255	4,786	3,402	1,067	21........................	5,935	3,570	1,480	885
Oct. 2............................	9,481	5,057	3,468	956	28........................	5,437	3,506	1,311	620
9............................	7,458	3,716	2,726	1,016	Oct. 5........................	4,998	3,173	1,382	443
16............................	6,808	2,825	2,301	1,682	12........................	5,874	2,988	1,573	1,313
23............................	6,616	2,135	2,404	2,077	19........................	5,847	1,896	708	3,243
30............................	6,034	1,373	1,570	3,091	26........................	3,705	912	173	2,620
Nov. 6............................	3,431	565	378	2,488	Nov. 2........................	3,602	320	103	3,179
13............................	1,508	63	130	1,315					

Estimates made by C. E. Schultz, U. S. Bureau of Agricultural Economics "by applying the percentages of various varieties and classes inspected by the Federal-State Inspection Service, to the total shipments of each week. Inspectors reported a comparatively light certification of Tokays and consequently this variety [as well as certain others] was checked against County Horticultural Commissioners reports" and these figures used to correct the estimates based on the Federal-State Inspection Service records. Data for 1925 from Schultz, C. E., mimeographed California Grape Deal for 1925, p. 48, 49 except that estimate for week ending Nov. 13 was made by the authors; for 1926 from unpublished estimates by Mr. Schultz similar to those for 1925.

Weekly Shipments of California Grapes by Classes, 1925 and 1926.—Figure 20 shows that heavy shipments of wine and raisin varieties largely account for California's tremendous shipments of grapes from the middle of September to the latter part of October. During the last four weeks in September of the past two years from 85 to 90 per cent of California's grape shipments have been of wine and raisin varieties. All of these shipments of wine varieties and a large majority of those of raisin varieties were shipped as juice stock to meet the heavy seasonal demand for wine making which usually takes place in the latter part of September and in October.
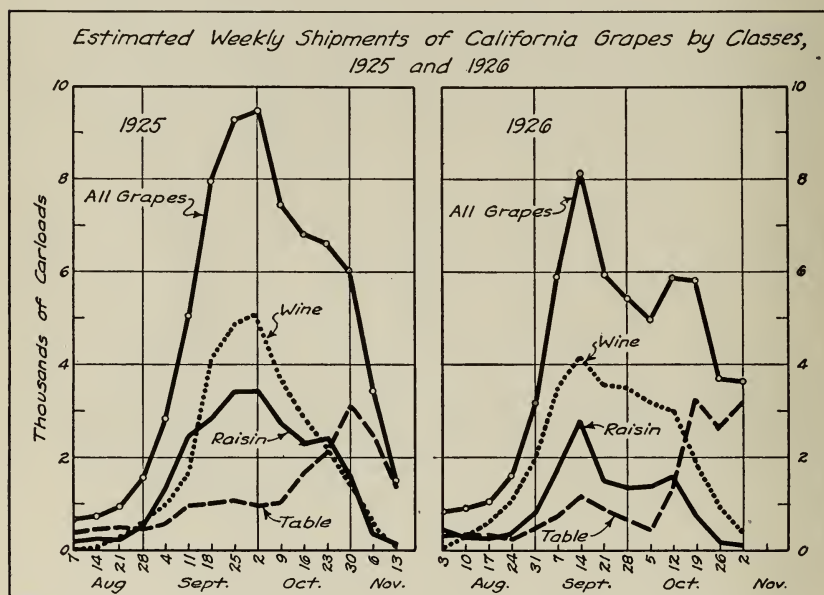
Fig. 20.—Heavy shipments of wine and raisin varieties largely account for California's tremendous increase in recent years of shipments of grapes from the middle of September to the latter part of October. Table varieties are shipped in the largest volume during the latter part of October and in early November. (Data from table 13, p. 72.)

Table varieties of grapes are shipped from California in the largest volume during the latter part of October and in early November. Comparison of the curve of shipments of table varieties in figure 20 with that of shipments of table stock in figure 19 makes it evident, however, that in the latter part of October particularly, a considerable portion of table varieties, chiefly the Malaga, are shipped as juice stock and not for table purposes.

GRAPE BY-PRODUCTS

Unpromising Outlook for Grape By-Products.—During the war, when prohibition first threatened the wine-manufacturing industry of California, it was believed by many that there were a number of promising outlets for the profitable utilization and disposal of the wine-grape crop of the state. Among the many suggested products were jelly, jam, marmalade, pickles, catsup, vinegar, candy extracts, pressed grape bricks, non-beverage wines for sacramental and medicinal purposes, ''de-alcoholized'' wine, grape juice, grape syrup (concentrated grape juice), and dried wine grapes. The last three uses— as juice, syrup, and dried—were viewed most optimistically as offering extensive and profitable outlets.[25]

Unfortunately for the wine-grape growers of California, these prospects of a large and expanding market for grape products have never materialized. Effective technical methods of processing, preserving, and storing most of the better grape products have been devised.[26] Up to the present time, however, the little effort that has been devoted to creating a demand for such products has not resulted in a market demand for any of them sufficiently profitably to dispose of an appreciable quantity of California grapes. The problem of salvaging wine and other juice varieties, however, has become more acute in the last few years. The output has increased so fast that prices have fallen rapidly[27] and, in addition, it has become increasingly difficult to dispose of No. 2 black wine grapes and lower grades at any reasonably remunerative figure. The same situation is true of even the best grades of juice grapes other than the much preferred black varieties.

California's Canned-Grape Pack, 1910–1926.—Little complete and accurate data are available concerning the disposition of California grapes for any purposes except for raisins, for fresh shipments, and for the commercial manufacture of wine and brandy.[28] Accurate

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[25] See articles in the California Grape Grower in 1920; for example, in the April, 1920, issue; discussion by Nougaret, R. L., The California Grape Industry, 1919, Calif. Dept. Agr. Spec. Pub. 6: 17–20. 1920, and Bulletin 15 on Dried Wine Grapes, issued by the California State Board of Viticultural Commissioners, June 15, 1919.

[26] See the publications of the Division of Viticulture and Fruit Products of the University of California. In particular see J. H. Irish, Fruit Juice Concentrates, Calif. Agr. Exp. Sta. Bul. 392, September, 1925.

[27] See discussion of prices, pp. 85–94.

[28] For California raisin production see tables 20 and 27, pp. 101 and 124. Shipments of fresh raisin grapes are shown in tables 8 and 9, pp. 46 and 54. Wine and brandy output, 1900–1918, is given in table 22, p. 111.

figures showing the annual volume of the canned-grape pack, however, are available for a quarter of a century or more. Table 14 shows the approximate tonnage of grapes that have been canned in the state annually from 1910 to 1926. It brings out the striking fact that only a small fraction of 1 per cent of the grape crop of the state has ever been canned. The largest pack in the last fifteen years utilized only 2,600 tons of grapes. Since 1910 the tonnage packed has ranged from this figure down to somewhat less than 1,000 tons. These statistics show no evident trend towards the utilization of an increased tonnage of grapes for canning.

TABLE 14

CALIFORNIA'S CANNED-GRAPE PACK, 1910–1926

Year	Number of cases	Fresh tons	Year	Number of cases	Fresh tons	Year	Number of cases	Fresh tons
1910	52,005	1,040	1916	101,130	2,022	1922	69,760	1,395
1911	79,715	1,594	1917	85,491	1,710	1923	54,210	1,084
1912	53,410	1,068	1918	99,068	1,981	1924	79,980	1,600
1913	48,115	962	1919	104,446	2,089	1925	130,269	2,605
1914	56,160	1,123	1920	114,886	2,298	1926	119,338	2,387
1915	77,610	1,552	1921	91,886	1,838	1927		

Data for 1910–1917 compiled from California Fruit News, and for 1918–1926 from figures of the Canners' League of California. The number of cases given disregards the size of tin except that No. 10 tins for all years are included on the basis of 6 cans per case. Cases are converted to an approximate fresh tonnage basis by dividing by 50.

California's Output of Grape Juice and Syrup and Dried Wine Grapes, 1919–1921.—Guesses regarding the tonnage of California grapes dried and converted into unfermented juice and syrup since the war are available for the three years 1919–1921 only. Although the estimates presented herewith in table 15 are of questionable value, they give some idea of the probable maximum annual amount of California's grape crop that has been utilized in the manufacture of these three by-products since prohibition. Some of the unfermented grape juice and grape syrup accounted for in this table was probably made from low-grade table grapes, but most of it was manufactured from wine grapes, and hence these figures may be used as the basis of a fair and interesting comparison with California's total wine-grape production for these years.

Apparently, the maximum percentage, as well as the greatest absolute tonnage of any wine-grape crop, was absorbed for these three uses in 1919. About 75,000 tons, or nearly 20 per cent of the crop, was dried or converted to juice and syrup in that year. Less than 10 per cent of the wine-grape crop was dried. In 1920 about 5 per

cent of the crop went into the three by-products and only about 2 per cent was dried. By 1921 the total tonnage accounted for in table 15 had declined to about 10,000 tons, or less than 4 per cent of the total wine-grape production of the state, and only 1 per cent of the crop was dried. The decline in utilization along these lines reflects the growing demand of the eastern markets for fresh wine grapes and the lack of a remunerative demand for the dried product and unfermented juice and syrup. In 1922 Nougaret, in touching upon this problem, states that ''grape juice and grape syrup have decreased in production, and the drying of wine grapes, so strongly encouraged in 1919, is no longer thought of.''[29]

TABLE 15

ESTIMATES OF CALIFORNIA'S OUTPUT OF DRIED WINE GRAPES AND OF ALL GRAPE JUICE AND SYRUP, 1919–1921

Year	Total	Grape juice		Grape syrup		Dried wine grapes		
	Tons	Gallons	Tons	Gallons	Tons	Dry tons	Green tons	Per cent of wine grape crop
1919	76,800	5,000,000	33,300	200,000	6,000	10,000	37,500	9
1920	21,000	1,500,000	10,000	100,000	3,000	2,000	8,000	2
1921	10,744	1,000,000	6,700			1,011*	4,044	1

* Included in raisin crop.

Data from Nougaret, R. L. Status of California Grape Industry, June 30, 1922. Calif. Dept. Agr. Spec. Pub. **28**:15. 1922.

Market Outlook for Vinifera Juice and Syrup.—Grape syrup and grape juice have probably been suggested most frequently as the best outlet for California's low-grade and surplus grapes. This is in part due to the fact that the unfermented juice of eastern grapes, chiefly the Concord, has found much favor with the American public, in spite of its relatively high price compared with most soft drinks. The present volume of sales of eastern grape juice has, however, been built up over a period of about twenty years at considerable cost for advertising and for establishing effective distribution. Although a large amount of eastern grapes are converted to juice in New York and Michigan particularly, only a fraction of the eastern grape crop is utilized for this purpose.

Available data from the chief juice-pressing section, the Chautauqua-Erie grape belt of New York, indicate that the trend of the output

[29] Nougaret, R. L. Status of Californinia grape industry, June 30, 1922. Calif. Dept. Agr. Spec. Pub. **28**: 18–19. 1922.

of unfermented grape juice in the east has been declining during the last ten years.[30]

These facts would seem to indicate that it is questionable whether there is much likelihood of greatly reducing the competition between California and eastern fresh grapes by any large expansion in the output of grape juice pressed from eastern grapes in the next few years. However, the outlook in this regard may be very uncertain, for, if eastern-grape prices remain for several years near the very low level of $28 per ton in 1926, production and consumption of eastern-grape juice may be appreciably stimulated. Special study of the outlook for the eastern grape-juice industry is necessary to visualize its future with any assurance of success.

A further important consideration in regard to the probable limitations of the market expansion for California grape juice and syrup lies in the fact that the sale of unfermented California grape juice, or carbonated beverages made therefrom, seems to be seriously handicapped by the cultivated American taste for the eastern juice with its characteristic flavor and its high acid and low sugar content. Considering the relatively small consumption of eastern grape juice after it has been well advertised and distributed for many years, it seems questionable whether the demand for unfermented *vinifera* grape juice as a beverage can be economically stimulated in the United States sufficiently in the next few years to profitably dispose of any appreciable portion of California's tremendous grape production.[30a]

In spite of its appeal to the American palate, the expansion of the consumption of even eastern grape juice has been seriously retarded by competition with the innumerable cheap soft drinks which have flooded the country in recent years. The general public seems to be less concerned with the question of whether a soft drink is made from

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[30] This statement is based on statistics showing the approximate tonnage of grapes used in the production of unfermented grape juice in the Chautauqua-Erie grape belt of New York from 1911 to 1926. The original estimates were made by the Grape Belt and have been compiled from that source for the years 1916–1926, and from Welch, J. F., The grape juice industry, (in The Fruit Industry in New York State, N. Y. State Dept. Markets Bul. 147: 301, 302. November, 1922) for the years 1911–1915. In this article Mr. Welch says that ''it is estimated that close to 70 per cent of the [eastern grape juice] output comes from New York factories.'' That most of the New York plants are in the Chautauqua-Erie belt is indicated by statements of Mr. Welch in a letter written May 21, 1926, to the effect that, outside of this district, there are three factories in Michigan and a few other small plants mostly scattered throughout central New York and the Hudson River section of the state. It is understood, however, that there is at least one large juice plant in the Ozark Mountain grape-producing section.

[30a] Stoll, H. F. How can we salvage our California wine grapes? Calif. Grape Grower, 5[6]: 1. June, 1924.

real juices than with the question of a cool drink at a low price per glass. To manufacture and distribute carbonated beverages from pure fruit juices at as low a price as those made with the usual imitation fruit flavors has not as yet proved feasible on any large scale. Carbonated beverages made from real eastern grape juice do not sell at such a low figure, and hence the demand for them is limited to those whose taste and means lead them to pay the necessarily higher price.

It is understood that recently there has been some increase in the sale of the concentrated juices of California grapes and raisins. If, however, this increase is based largely on a demand for wine making in the home, as has been reported, it is little, if any, indication of any rosier outlook for the disposal of these grape products for use in unfermented beverages.

In summarizing the question, ''How Can We Salvage Our Grapes?'', Mr. Stoll states that in all the years since prohibition ''it must be admitted that none of the grape products manufactured have helped materially to solve our salvage problem. . . . . So far, no by-product has been invented or manufactured that has gained sufficiently in popularity to figure materially in the solution of our salvage problem, and no state-wide plan has been designed to use these grapes to profitable advantage. . . . . The problem is greater today because production is larger and modern standardization, inspection, and regulation have created a demand for only sound No. 1 grapes. Nobody in the shipping games wants to risk shipping inferior grapes.''[31] ''What we need is a new grape product that will be legitimate and *salable,* one that will appeal to 110,000,000 people of the United States. Until that magic product is found, we fear that there will be no solution of the wine-grape growers' dilemma as to what they shall do with their . . . . surplus grapes each fall.''[32]

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[31] In the California Grape Grower, 8[1]: 6. January, 1927.

[32] Stoll, H. F. How can we salvage our California wine grapes?, in the California Grape Grower, 5[6]: 1. June, 1924.

PRINCIPAL MARKETS FOR CALIFORNIA GRAPES[33]

Grape Unloads in Chief Cities, 1924–1926.—The data in table 23 on unloads of grapes during 1924, 1925, and 1926 in thirty-six of the largest cities in the United States, show the geographical distribution of nearly 70 per cent of the country's grape shipments in these years.[34] They reflect the relative importance of the principal grape-marketing centers of the United States. Because of California's abnormally heavy grape shipments in 1925, 95 per cent of the grape unloads in these cities in that year originated in the state. In 1924 and 1926, however, years more nearly typical of California's grape movement, about 85 per cent of the carlot unloads in these 36 cities came from the state. In the fifteen cities lying north of the Mason and Dixon line and east of the Mississippi River for which data are given, approximately 60 per cent of both the national and California's shipments of grapes were unloaded. Six cities alone in this territory, New York, Chicago, Boston, Philadelphia, Pittsburgh, and Newark, absorbed approximately 50 per cent of the country's total carlot movement of grapes in the last three years, and over 51 per cent of California's shipments.

Comparison of Unloads from California and from Other States.— A study of the percentage of the total unloads of grapes in different cities which were supplied by California in the last three years, as shown in table 23, gives an idea of the relative amount of competition which the grapes from this state meet in each of these markets. California's grape shipments and unloads were unusually large in 1925 and those from the eastern states below average, hence data for this year should not be used as a basis of such a comparison. The years

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[33] Data, maps, and charts showing grape unloads in 27 cities in 1923 and the primary and secondary destination of California shipments are given in Cricher, A. Lane. Transportation of Pacific Coast perishables. U. S. Bur. Foreign and Domestic Commerce Trade Promotion Series Bul. 12. 1924. The primary destination of carlot shipments of eastern grapes from each important producing section in 1918 is tabulated in Alleman, D. Marketing eastern grapes. U. S. Dept. Agr. Bul. 861: 55–61. September, 1920. The mimeographed California Grape Deals for 1923 and 1924, issued by the U. S. Bureau of Agricultural Economics, give grape unloads for 1923 in 27 of the chief cities. Monthly carlot arrivals of grapes in New York City by states of origin in 1923 and the monthly totals from all states for the years 1920–1922 are given in the mimeographed California Grape Deal for 1923, p. 22. The 1923 Deal also gives the primary destination of California grape shipments, Aug. 3 to Nov. 10, 1923, being the source of the data referred to above which Cricher presents.

[34] National shipments of grapes in 1924 were almost 70,000 carloads, in 1925 nearly 81,900, and in 1926 about 77,500. California's shipments in 1924 were nearly 57,800 carloads, in 1925 nearly 76,100, and in 1926 slightly over 63,500 carloads.

1924 and 1926, however, may be considered fairly typical of the maximum relative competition California unloads are likely to meet from other states.

In general it may be said that unloads of eastern grapes are most important as competitors of California grapes in those cities and areas which are close to the chief eastern grape producing centers. In other words, since the chief eastern grape producing and consuming areas are relatively close together, the output from these states is unloaded in the heaviest volume on many of the very markets that are the heaviest consumers of California grapes. The general truth of this statement is proven by the fact that in 1926 over 88 per cent of California's grape unloads and 92 per cent of those from the rest of the United States were unloaded in the same group of cities, i.e., those in New England, the Middle Atlantic, the East North Central, and the West North Central.[35]

The fact that only about 55 per cent of shipments of eastern grapes were unloaded in the 33 cities for which unloads are available in both 1924 and 1926, seems to indicate that a very large part of the grapes originating outside of California are consumed in cities smaller than those listed.

FOREIGN TRADE IN FRESH GRAPES[36]

Imports.—Before the war about 18,000 tons of fresh grapes were imported into the United States each year. (See table 16.) More than 95 per cent of this amount came from Spain, the United States then being the second largest importer of grapes from the Province of Almeria.[37] Largely because of the Federal Horticultural Commission's rigid quarantine since 1922 against importation of Spanish grapes grown in Almeria, imports of grapes from Spain have been reduced to almost nothing in the last three years. Should the quarantine be lifted in the future, imports from Spain would probably be resumed on a considerable scale.

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[35] In drawing conclusions from carlot unloads of grapes from other states it must not be forgotten that proximity to markets has resulted in a considerable but unknown portion of eastern grapes moving by motor truck from some producing areas into several important consuming centers.

[36] Data are compiled from the annual numbers of Foreign Commerce and Navigation of the United States, U. S. Dept. Commerce, Bur. Foreign and Domestic Commerce. Fresh grape exports from the United States are not available before 1922.

For statistics of international trade in fresh grapes, average 1909–1913 and annual 1922–1924 by chief exporting and chief importing countries, see U. S. Dept. Agr. Yearbook, 1925: 879. 1926.

[37] U. S. Bur. Agr. Econ., Foreign Crops and Markets, 9: 599–601. Dec. 3, 1924.

Practically all imported grapes, except those from Italy, are table varieties. Total imports in 1925 were only 1,400 tons. Most of these arrived during the winter from the hot houses of Belgium[38] and from Argentina,[39] where the seasons are the reverse of ours. These imports, therefore, have competed but slightly, if at all, with California grapes, only a few of which are held in storage for our winter markets. For the three years before the tariff of 1922, Canada was the second largest

TABLE 16

IMPORTS OF FRESH GRAPES INTO THE UNITED STATES BY CHIEF COUNTRIES OF ORIGIN, IN TONS, AVERAGE 1910–1914; ANNUAL 1920–1925

Country from which imported	Average July 1, 1909 to June 30, 1914	Calendar years							
		1920	1921	1922	1923	1924	1925	1926	1927
Spain	18,590	9,848	6,546	12,676	8,949	19	0		
Belgium	255	340	406	425	420	446	382		
Canada	40	2,686	2,717	3,715	196	93	100		
Argentina	2		5	270	385	592	825		
Italy	1	3	34	131	484	198	80		
Chile			5	280	190	43	166		
All others	148	13	61	111	168	11	1		
Total	19,036	12,890	9,774	17,608	10,792	1,402	1,554	4,068	
Per cent of 1910–1914 average	100	67.7	51.3	92.5	56.7	7.4	8.2	21.4	

Sources of data: Years 1910–1914 and 1920–1925 compiled from annual numbers of U. S. Department of Commerce, Foreign Commerce and Navigation of the United States. Preliminary data for 1926 from U. S. Monthly Summary of Foreign Commerce for Dec., 1926. Imports as officially stated in cubic feet are converted to approximate tons on the basis of 26 pounds of grapes per cubic foot.

importer of grapes into the United States, averaging nearly 3,000 tons a year. For the past two years, however, we have received less than 100 tons a year from Canada. The possibility of greatly increased imports of wine grapes grom Italy has been widely discussed in recent years. The most usual conclusion, however, is that such a possibility is very remote.[40]

Exports.—The tonnage of fresh grapes exported from the United States is exceedingly small compared with total production. The 12,000 tons exported in 1925 were only about 0.5 per cent of the two-million-ton crop. That the tonnage exported, however, has been increasing in recent years is shown in figure 21. The 1925 exports nearly doubled those of 1922, and the 1926 tonnage of over 15,300

[38] Anonymous. California Grape Grower, 3[1]: 5. January, 1922.

[39] See U. S. Bur. Agr. Econ., Foreign Crops and Markets, 11: 769. June 22, 1925, and Nougaret, R. L. Status of California grape industry, 1922. Calif. Dept. Agr. Spec. Pub. 28: 40–42, 45. 1922.

[40] See The California Grape Grower, 5[1]: 8. January, 1924; 6[2]: 6. February, 1925; 6[10]: 1–2. October, 1925; and later issues.

was even larger than that of 1925. Canada is our principal foreign market, having taken 65 per cent of our total exports of grapes in the past four years. Cuba, our next largest foreign customer, took 18 per cent during this period; while Mexico was third with 9 per cent. The remaining 8 per cent was bought in small quantities by over thirty other countries.
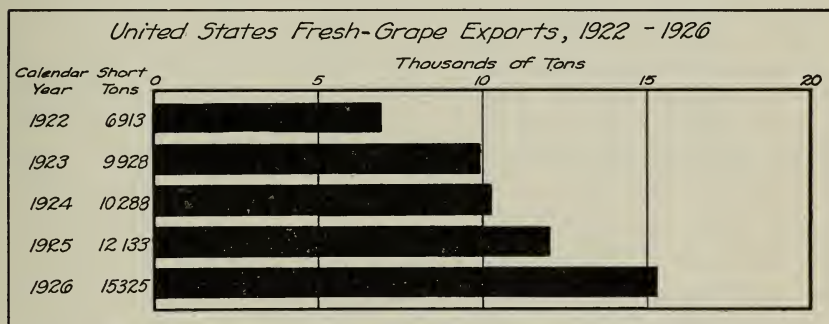
Fig. 21.—Exports of fresh grapes, although gradually increasing, account for less than 1 per cent of United States production. (Data compiled from annual numbers of U. S. Dept. Commerce, Foreign Commerce and Navigation of the United States.)

WEEKLY VARIATION IN PRICES

Comparison of the Same Varieties in Different Years.—The question, "Do weekly prices of the same kind of grapes tend to move up and down in about the same way in different years?" is one vital to growers and shippers, from the standpoint of better time distribution of the grape crop during the marketing season. Figure 22 is designed to make it easier to compare the weekly variations in grape prices from August first through the middle of November during the past three years. At first glance, these curves show no very apparent similarity in the seasonal movement of the same varieties of grapes in different years, although a careful comparison seems to indicate some regularity in seasonal variation. It seems doubtful, however, whether the degree of likeness in the comparative fluctuations of prices in the different years shown is sufficient to be of much, if any, value as a basis for indicating how shippers may in any practicable way increase their returns by putting more grapes on the market during periods when prices are most likely to be higher than average.[41]

[41] A more intensive study of seasonal variations in grape prices and the factors determining them is beyond the scope of the present bulletin. The possibility of discovering valuable relationships in this field, however, make such studies highly advisable.
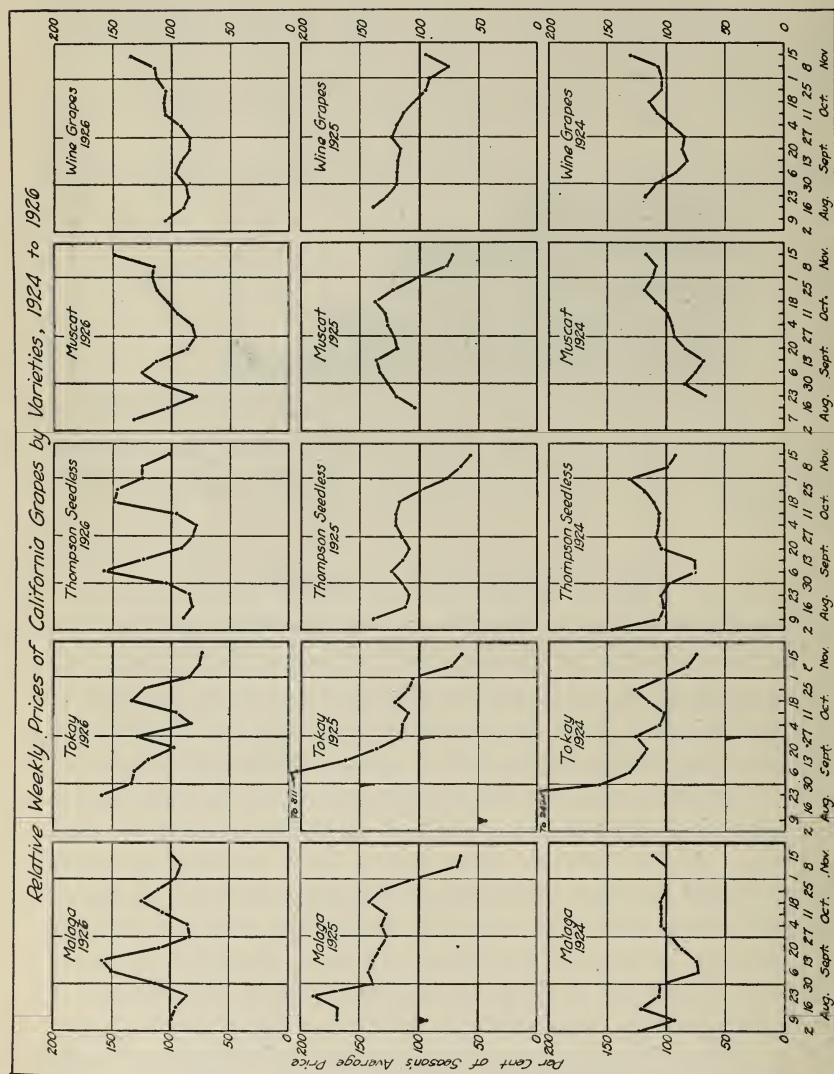
Fig. 22.—There is a tendency for the price of California grapes, especially that of table varieties, to be high early in the season and to rise in the latter part of September or more usually in October. The peculiar seasonal demand for juice stock results in a tendency for the price of wine varieties and of Muscats to rise above the average in October. (Data from table 17, p. 84.)

Tokays.—A study of figure 22 discloses the fact that the similarity in the seasonal movement of prices in different years is much more noticeable with some kinds of grapes than with others. Tokay prices, shown in the second column, exhibit more similarity of movement than any other variety pictured. Every year from 1917 to date Tokay prices have been uniformly high in August, then have tended to fall rather rapidly until a low point has been reached in the latter part of September or early in October. This usually has been followed by a more or less noticeable rise in prices for a week or two in the last of October which, in turn, has frequently, though not always, been followed by the rather abrupt declines indicated for 1924–1925, prices, usually reaching the lowest point of the season about the middle of November.

Malagas.—There has been no striking similarity in the seasonal movement of Malaga prices in the last three years. The earliest Malagas, reaching the markets as they do when the supply of grapes is light, usually bring a high price, followed by the tendency to decline until late in August or early in September. Frequently, rising prices then occur until a secondary peak somewhat above the seasonal average is reached about the middle of October. Frequently there has been a decline during the latter part of October and the first few weeks in November.

Thompson Seedless.—Early in the season Thompson Seedless, like Malagas, have regularly commanded high prices, showing a tendency to decline rather rapidly until they reached what has usually been the lowest point of the season in the latter part of August or, at times, well into September. The price has customarily risen from then until near the latter part of October, when a more or less rapid decline has taken place. Exceptions to the tendencies just described are quite evident from a study of the prices pictured in figure 22.

Wine Grapes and Muscats.—The prices of wine grapes as a group have been characterized by a fairly regular tendency to rise during the month of October, sometimes falling and at other times rising in the early part of November. Muscats, the large majority of which are used for wine making, have shown a somewhat similar tendency, in most years.

Comparison of Different Varieties in the Same Year.—Whether or not there is, in a given season, any tendency for weekly prices of different kinds of grapes to move up and down together is a question more easily answered than the one just considered. Weekly prices of all varieties of grapes in 1925, shown in figure 22, have a striking and

much greater similarity in movement than in either 1924 or 1926. With the exception of Muscats, the prices of every variety in 1925 were relatively high in August but tending to decline. In the latter part of September or the first three weeks in October there was a small but noticeable tendency to advance for a short time, followed by a precipitate drop during the last five or six weeks. A comparison of the seasonal variation in prices of different varieties in 1924 and in 1926 discloses two general tendencies for nearly every variety;

TABLE 17

Weekly Eastern Delivered-Auction Prices of California Grapes per Lug, by Varieties, 1924–1926

Week ending	Malaga		Tokay		Thompson Seedless		Muscat		Wine varieties	
	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average
1926										
Average......	**1.11**	**100.0**	**1.38**	**100.0**	**1.09**	**100.0**	**1.03**	**100.0**	**1.40**	**100.0**
Aug. 7............	1.10	99.1			.97	89.0	1.35	131.0	1.45	103.5
14............	1.07	96.4			.89	81.7	1.04	101.0	1.24	88.8
21............	.97	87.4	2.21	160.0	.92	84.4	.81	78.5	1.17	83.5
28............	1.26	113.5	1.87	135.5	1.14	104.6	1.13	109.6	1.21	86.5
Sept. 4............	1.67	150.5	1.82	132.0	1.72	157.8	1.28	124.3	1.35	96.5
11............	1.76	158.6	1.67	121.0	1.36	124.8	1.15	111.5	1.27	90.9
18............	1.21	109.1	1.37	99.3	.99	90.8	.88	85.3	1.17	83.6
25............	.93	83.8	1.81	131.1	.88	80.7	.81	78.5	1.16	82.9
Oct. 2............	.96	86.5	1.13	82.0	.85	78.0	.83	80.5	1.27	90.9
9............	1.19	107.2	1.34	97.3	· 1.06	97.2	.97	94.1	1.45	103.5
16............	1.39	125.2	1.88	136.1	1.62	148.6	1.05	101.9	1.50	107.0
23............	1.24	111.7	1.71	124.1	1.59	145.9	1.14	110.8	1.45	103.5
30............	1.06	95.5	1.20	87.0	1.36	124.8	1.19	115.6	1.55	110.8
Nov. 6............	1.01	91.0	1.05	76.2	1.36	124.8	1.18	114.7	1.58	113.0
13............	1.11	100.0	1.00	72.5	1.11	101.8	1.53	148.5	1.91	136.3
1925										
Average......	**1.03**	**100.0**	**1.13**	**100.0**	**1.04**	**100.0**	**.97**	**100.0**	**1.51**	**100.0**
Aug. 8............	1.68	163.1			1.44	138.5			2.10	139.1
15............	1.68	163.1			1.16	111.5	1.00	103.1	1.92	127.2
22............	1.95	189.3			1.13	108.7	1.16	119.6	1.92	127.2
29............	1.43	138.8	3.52	311.5	1.18	113.5	1.21	124.7	1.80	119.2
Sept. 5............	1.47	142.7	2.29	202.7	1.27	122.1	1.28	132.0	1.80	119.2
12............	1.43	138.8	1.82	161.1	1.18	113.5	1.31	135.1	1.79	118.5
19............	1.37	133.0	1.52	134.5	1.13	108.7	1.16	119.6	1.75	115.9
26............	1.31	127.2	1.29	114.2	1.18	113.5	1.17	120.6	1.85	122.5
Oct. 3............	1.34	130.1	1.28	113.3	1.24	119.2	1.22	125.8	1.80	119.2
10............	1.32	128.2	1.24	109.7	1.24	119.2	1.24	127.8	1.71	113.2
17............	1.46	141.7	1.35	119.5	1.21	116.3	1.32	136.1	1.58	104.6
24............	1.34	130.1	1.24	109.7	1.02	98.1	1.18	121.6	1.43	94.7
31............	1.08	104.9	1.17	103.5	.79	76.0	.97	100.0	1.39	92.1
Nov. 7............	.68	66.0	.81	71.7	.67	64.4	.73	75.3	1.12	74.2
14............	.65	63.1	.71	62.8	.58	55.8	.69	71.1	1.43	94.7

TABLE 17—(*Concluded*)

Week ending	Malaga		Tokay		Thompson Seedless		Muscat		Wine varieties	
	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average	Dollars	Per cent of average
1924										
Average......	**1.31**	**100.0**	**1.40**	**100.0**	**1.06**	**100.0**	**1.12**	**100.0**	**1.90**	**100.0**
Aug. 1..............	1.63	124.4	....	....	1.54	145.3	....	....	....	....
8..............	1.24	94.7	....	....	1.12	105.7	....	....	....	....
15..............	1.59	121.4	....	....	1.08	101.9	....	....	....	....
22..............	1.39	106.1	3.49	249.3	1.10	103.8	.74	66.1	2.23	117.4
29..............	1.39	106.1	2.20	157.1	1.04	98.1	.94	83.9	2.06	108.4
Sept. 5..............	.96	73.3	1.82	130.0	.79	74.5	.84	75.0	1.72	90.5
12..............	.98	74.8	1.71	122.1	.79	74.5	.77	68.7	1.55	81.6
19..............	1.13	86.3	1.64	117.1	1.04	98.1	.95	84.8	1.65	86.8
25..............	1.27	96.9	1.73	123.6	1.15	108.5	1.04	92.9	1.61	84.7
Oct. 3..............	1.35	103.1	1.47	105.0	1.12	105.7	1.07	95.5	1.81	95.3
10..............	1.35	103.1	1.41	100.7	1.12	105.7	1.11	99.2	2.05	107.9
17..............	1.37	104.6	1.58	112.9	1.16	109.4	1.22	108.9	2.16	113.7
24..............	1.32	100.8	1.77	126.4	1.26	118.9	1.34	119.6	1.98	104.2
31..............	1.31	100.0	1.47	105.0	1.39	131.1	1.25	111.6	1.96	103.2
Nov. 7..............	1.31	100.0	1.14	81.4	1.05	99.1	1.21	108.0	2.02	106.3
14..............	1.45	110.7	1.04	74.3	.98	92.5	1.32	117.9	2.48	130.5

See footnote to tables 18 and 25, pp. 86 and 120, for sources of data. The weekly and seasonal prices are weighted average prices on the eleven chief eastern delivered-auction markets, except in the case of wine grapes. The weekly price of wine grapes is a simple or unweighted average of the weighted average auction prices of Alicante Bouschet, Carignane, Mission, Petite Sirah, Zinfandel, and Mataro varieties. The seasonal average for wine grapes is a simple average of the weighted average for the season of these same varieties. The prices are converted to relatives by dividing the seasonal average into the weekly prices.

first, to be high in price early in the season, and second, to rise in the latter part of September or more usually in October. Wine grapes and Muscats showed less of a tendency to bring high prices in the first weeks they came upon the market than did table grapes.

ANNUAL PRICES AND PURCHASING POWER

Table Grapes, 1910–1926.—Annual averages of the prices of Malaga and Tokay varieties from 1910 to 1926, representing the approximate f.o.b. return at California shipping points to table-grape growers of the state, are used in figure 23.[42] The solid line, indicating

[42] The footnote to table 18, page 86, describes in detail the source of these prices and methods used in computing them. The f.o.b. price has been estimated by subtracting freight and refrigeration and a 7 per cent sales commission from the Eastern delivered-auction price. Representative figures showing the cost of packages, packing, and loading table grapes for each year could not be secured, and for this reason it has been impossible to compute the approximate *farm* price received by California growers. Any reader who might supply such data on costs for any or all years from 1910 through 1926, would render valuable assistance in further studies of the California grape industry.

TABLE 18

Prices and Purchasing Power of California Malaga and Tokay Grapes, 1910–1926

Eastern Delivered-Auction and Estimated F.O.B. Shipping Points

Year	(1) Malaga: Gross auction price per crate (dol.)	(2) Malaga: f.o.b. price per crate (dol.)	(3) Malaga: f.o.b. price per net ton (dol.)	(4) Malaga: price, % of 1910-14 avg	(5) Malaga: purchasing power per net ton (dol.)	(6) Malaga: purch. power, % of 1910-14 avg	(7) Tokay: Gross auction price per crate (dol.)	(8) Tokay: f.o.b. price per crate (dol.)	(9) Tokay: f.o.b. price per net ton (dol.)	(10) Tokay: price, % of 1910-14 avg	(11) Tokay: purchasing power per net ton (dol.)	(12) Tokay: purch. power, % of 1910-14 avg	(13) M-T avg: Gross auction price per crate (dol.)	(14) M-T avg: f.o.b. price per crate (dol.)	(15) M-T avg: f.o.b. price per net ton (dol.)	(16) M-T avg: price, % of 1910-14 avg	(17) M-T avg: purchasing power per net ton (dol.)	(18) M-T avg: purch. power, % of 1910-14 avg	(19) All-commodity wholesale price index
Average 1910-14	**1.07**	**0.58**	**41.70**	**100**	**41.30**	**100**	**1.15**	**0.66**	**47.40**	**100**	**47.20**	**100**	**1.14**	**0.61**	**44.20**	**100**	**43.90**	**100**	**100**
1910	1.36	0.83	59.80	143	58.10	141	1.17	0.66	47.50	100	46.10	98	1.27	0.75	54.00	122	52.50	120	103
1911	0.82	0.36	25.90	62	27.30	66	1.04	0.57	41.10	87	43.30	92	0.93	0.43	30.90	70	32.60	74	95
1912	1.09	0.60	43.30	104	42.90	104	1.10	0.61	43.60	93	43.60	92	1.10	0.61	44.00	100	43.60	99	101
1913	1.10	0.61	44.00	105	43.10	104	1.48	0.96	69.20	146	67.90	144	1.29	0.78	56.00	127	54.90	125	102
1914	0.98	0.49	35.30	85	35.30	86	0.97	0.49	35.30	75	35.30	75	0.98	0.50	36.00	81	36.00	82	100
1915	1.09	0.60	43.30	104	42.10	102	1.23	0.73	52.60	111	51.10	108	1.16	0.66	47.50	107	46.10	105	103
1916	1.24	0.74	53.30	128	41.30	100	1.46	0.94	67.70	143	52.50	111	1.35	0.84	60.50	137	47.00	107	129
1917	1.36	0.85	61.20	147	34.00	82	1.19	0.69	49.70	105	27.60	58	1.28	0.77	55.40	125	30.80	70	180
1918	1.90	1.26	90.60	217	45.80	111	1.85	1.21	87.10	184	44.00	93	1.88	1.24	89.20	202	45.00	103	198
1919	2.11	1.45	104.30	250	49.70	120	1.98	1.32	95.00	200	45.20	96	2.05	1.39	100.00	226	47.40	108	210
1920	2.72	1.87	134.80	323	58.60	142	2.53	1.69	121.60	256	52.90	112	2.63	1.83	131.90	298	57.40	131	230
1921	2.29	1.47	106.00	254	70.70	171	2.20	1.39	100.00	211	66.70	141	2.25	1.43	103.00	233	68.70	157	150
1922	1.66	0.95	68.40	164	45.00	109	1.91	1.18	85.00	179	55.90	118	1.79	1.06	76.30	173	50.20	114	152
1923	1.48	0.78	56.00	134	35.90	87	1.72	1.01	72.70	153	46.60	99	1.60	0.90	64.80	147	41.50	95	156
1924	1.53	0.83	59.80	144	39.40	95	1.69	0.99	71.30	150	46.90	99	1.61	0.91	65.50	148	43.10	98	152
1925	1.36	0.68	48.80	117	30.30	73	1.37	0.69	49.70	105	30.70	65	1.37	0.69	49.70	113	30.70	70	162
1926	1.28	0.60	43.30	104	28.20	68	1.50	0.80	57.60	122	37.40	79	1.39	0.70	50.40	114	32.80	75	154
1927																			

Sources of data:

Col. 1. Years 1910–1911 compiled from California Fruit News. Unweighted averages for the bulk of each season of a limited but fairly representative number of daily price ranges on the New York and Chicago delivered-auction markets. Years 1912–1923, weighted averages of eastern delivered-auction prices of Malagas from the Fresno district compiled by the California Fruit Exchange. Data for 1917–1924 published in Blue Anchor 2[3]:33. Aug., 1925. (Typographical error in published figure for 1921 and 1923, however, corrected.) Years 1924–1925 from Schultz, C. E., mimeographed California Grape Deal for 1925; and year 1926 from U. S. Bur. Agr. Econ. Daily Market Report on California Grapes No. 80, (mimeo.) Nov. 6, 1926, and subsequent issues.

Cols. 2, 8, and 14. Computed by subtracting freight and refrigeration charges per crate (see table 24, page 118) and a sales commission of 7 per cent from the gross eastern delivered-auction price (in cols. 1, 7, and 13).

Cols. 3, 9, and 15. Computed by multiplying the estimated f.o.b. price per crate (in cols. 2, 8, and 14) by 80.

Cols. 4, 10, and 16. Computed by dividing the estimated f.o.b. price per ton (in cols. 3, 9, and 15) by the average price for 1910–1914.

Cols. 5, 11, and 17. Computed by dividing the f.o.b. price per ton (in cols. 3, 9, and 15) by the all-commodity wholesale price index for the same year as given in col. 19.

Cols. 6, 12, and 18. Computed by dividing purchasing power per ton (in cols. 5, 11, and 17) each year by the average purchasing power for the five years 1910–1914.

Col. 7. Delivered-auction prices of Tokays. Years 1910–1923 sales of crates in Chicago and New York with either Boston or Philadelphia substituted wherever Chicago or New York quotations were not available. Years 1910–1916 are unweighted seasonal average daily price ranges compiled from the California Fruit News. Years 1917–1923 computed from daily data compiled by the Stewart Fruit Company from the Chicago Fruit and Vegetable Reporter, the New York Fruit Reporter, the Philadelphia Produce Market Report, and S. J. Shallows and Co. Boston Market Letter. Years 1924–1926 from same source as Malaga prices.

Col. 13. Unweighted or simple average of the seasonal price of Malagas (col. 1) and Tokays (col. 7).

Col. 19. U. S. Bureau of Labor Statistics all-commodity wholesale price index for the United States for calendar years, converted to a 1910–1914 base of 100 per cent. From U. S. Bur. Agr. Econ., Agricultural Situation 9[2]:8. Feb., 1927.

the price per ton, shows strikingly the rapid rise in prices from about
$35 a ton in 1914 to about $130 in 1920, followed by an even more
precipitous drop to the new low level of $50 a ton in 1925 and 1926.
The fluctuations in prices shown in this curve represent price changes
that have been due to two sets of causes: one, the changing value
of the dollar; the other, changes in the relation of supply of, and
demand for, grapes.
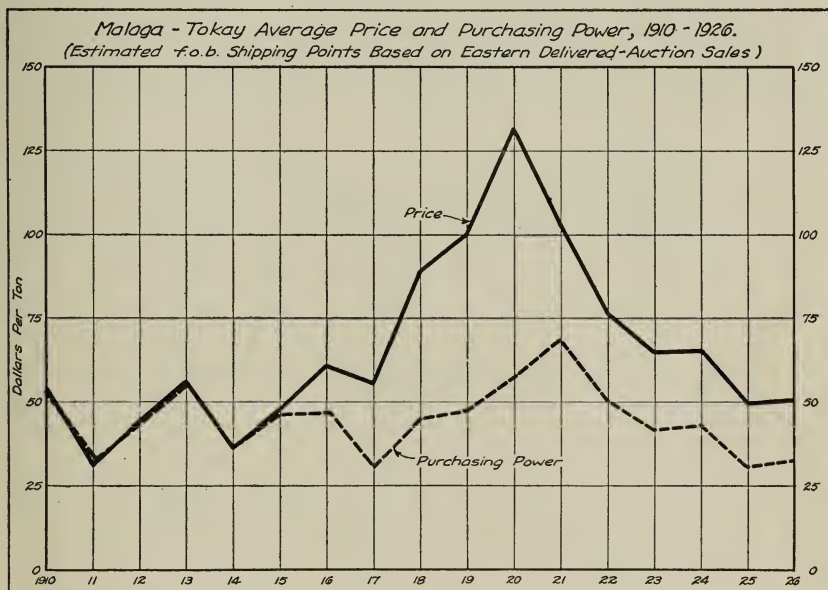
Fig. 23.—Prices of California table grapes rose steadily and rapidly from
1914 to 1920, trebling in this period. After 1920 they dropped precipitously until
1925. Returns per ton in terms of dollars of pre-war purchasing power rose and
fell less rapidly than actual prices, reaching a peak in 1921 and declining sharply
since then, dropping below pre-war purchasing power in the last two years. (Data
from table 18, p. 86.)

It has not been possible in any year since 1914 for Americans to
purchase as many units of goods in general for a dollar as they could
from 1910 to 1914. The supply of money and credit from 1914 to
1920 increased faster than the trade demands for it and chiefly as a
result of this fact the value of money, or its purchasing power, fell.
As a result of this decline in the value of money, at least two dollars
were necessary in 1918, 1919, and 1920 to buy goods in general which
could have been bought for one dollar in 1914. This being the case,
the dollars which grape growers received in these years were worth
in purchasing power less than half those which they had received and
spent before 1914.

In order to approximate what California growers got per ton for their grapes in terms of general purchasing power, changes in the value of the dollar have been eliminated by the best method at present available to economists and statisticians. The upper solid line in figure 23 shows the actual prices received. The dashed line shows these same prices after they have been converted to purchasing power, that is, deflated, or expressed in terms of dollars of the average value or purchasing power for the period 1910–1914. The fluctuations pictured in this curve of purchasing power per ton represent, therefore, price changes which have resulted primarily from changes in the supply of, or the demand for, grapes; or from coincident changes in both.
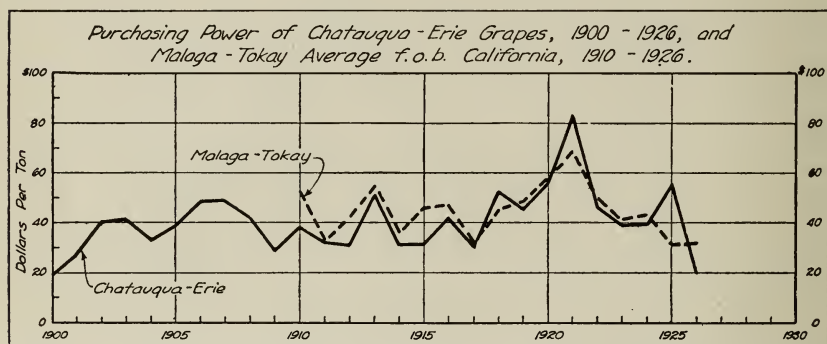
Fig. 24.—The purchasing powers of California and eastern table grapes have moved up and down together rather consistently since 1910. (Data from tables 18 and 19, pp. 86 and 89.)

The purchasing power of California table grapes averaged $43 per ton for the nine years 1910–1918, showing a very slight trend downward during the period, just as raisin prices did.[43] From 1917 to 1921, however, their purchasing power per ton more than doubled, rising rapidly from about $30 to nearly $70, and averaging $54 for the five years, 1918–1922. The purchasing power fell extremely rapidly from 1921 to 1925, in which latter year it was less than $30 per ton, or considerably less than one-half of the 1921 value. With the immediate outlook for crops at least as large as the enormous tonnages of 1925 and 1926,[44] there seems little reason to believe that the price and purchasing power of California table grapes will not remain relatively low for several years to come.

The curves of both price and purchasing power of table grapes illustrate the general principle that violent and prolonged upward swings in prices and purchasing power of a commodity are likely to

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[43] See discussion on pp. 103–106.   [44] See discussion, pp. 31–35.

be followed in due time by several years of unprofitably low prices. Such an occurrence is usually an indication of over-production. The price curves pictured in figures 26 and 29, pages 92 and 104, tell much the same price history for other kinds of grapes as the chart discussed above.

TABLE 19

ESTIMATED COMMERCIAL OUTPUT, PRICE, AND PURCHASING POWER OF CHAUTAUQUA-ERIE GRAPES, 1900–1926

Year	Commercial output		Estimated value		Price per ton	Purchasing power		U. S. all-commodity whole-sale price index
	Carloads of 10 tons	Per cent of 1910–1914	Dollars	Per cent of 1910–1914	Dollars	Per ton Dollars	Per cent of 1910–1914	
	1	2	3	4	5	6	7	8
1910–1914 average........	6,734	100	2,319,008	100	37	37	100	100
1900........................	7,669	114	1,200,500	52	16	19	51	83
1901........................	7,594	113	1,659,646	72	22	27	73	81
1902........................	5,062	75	1,694,226	73	34	40	108	86
1903........................	2,952	44	1,100,000	47	37	42	114	88
1904........................	7,479	111	2,150,000	93	29	33	89	88
1905........................	5,362	80	1,776,248	77	33	38	103	88
1906........................	5,634	84	2,482,822	107	44	48	130	91
1907........................	5,186	77	2,400,000	104	46	48	130	96
1908........................	4,232	63	1,640,000	71	39	42	114	92
1909........................	7,561	112	2,085,000	90	28	28	76	99
1910........................	5,700	85	2,200,000	95	39	38	103	103
1911........................	8,100	120	2,384,000	103	30	32	87	95
1912........................	7,528	112	2,315,036	100	31	31	84	101
1913........................	3,957	59	2,088,590	90	53	52	141	102
1914........................	8,386	124	2,607,415	113	31	31	84	100
1915........................	7,072	105	2,279,475	98	32	31	84	103
1916........................	4,307	64	2,344,653	101	54	42	114	129
1917........................	4,797	71	2,571,326	111	54	30	81	180
1918........................	2,087	31	2,200,905	95	105	53	143	198
1919........................	4,921	73	4,622,411	200	94	45	122	210
1920........................	5,350	79	6,854,740	296	128	56	151	230
1921........................	1,376	20	1,702,260	74	124	83	224	150
1922........................	7,857	117	5,490,900	237	70	46	124	152
1923........................	3,945	59	2,367,240	102	60	38	103	156
1924........................	5,200	77	3,117,240	134	60	39	105	152
1925........................	3,279	49	2,951,460	127	90	56	151	162
1926........................	8,188	122	2,544,332	110	31	20	54	154
1927........................								

Source of data:

Cols. 1 and 3. Years 1900–1915 from Phillips, H. D. Cooperative marketing in the Chautauqua-Erie grape industry. Cornell Agr. Exp. Sta. Memoir 28:14. Sept., 1919. Data on output and value for 1910 and on value for 1900 are estimates by Phillips. All other data originally compiled from annual estimates made and published by the Grape Belt, a semi-weekly newspaper published at Dunkirk, New York. Years 1916–1926 from the Grape Belt 32[32]:1. Jan. 21, 1927.

Col. 5. Values of col. 3 divided by tons from col. 1.

Col. 6. Prices per ton in col. 5 divided by the all-commodity wholesale price indexes in col. 8.

Col. 8. U. S. Bureau of Labor Statistics all-commodity wholesale price index for the United States for calendar years converted to a 1910–1914 base of 100 per cent. From U. S. Bur. Agr. Econ. Agricultural Situation 9[2]:8. Feb., 1927.

Returns for Eastern and California Table Grapes Compared.— The fairly close relationship between the price of eastern grapes and

of California table grapes is shown in figure 24.   The curves pictured therein are representative of the price of these two kinds of grapes, and indicate that there is a general tendency for prices of the two to move up and down together.   The average prices of the two for the same season, however, have seldom been the same.[45]   Apparently the
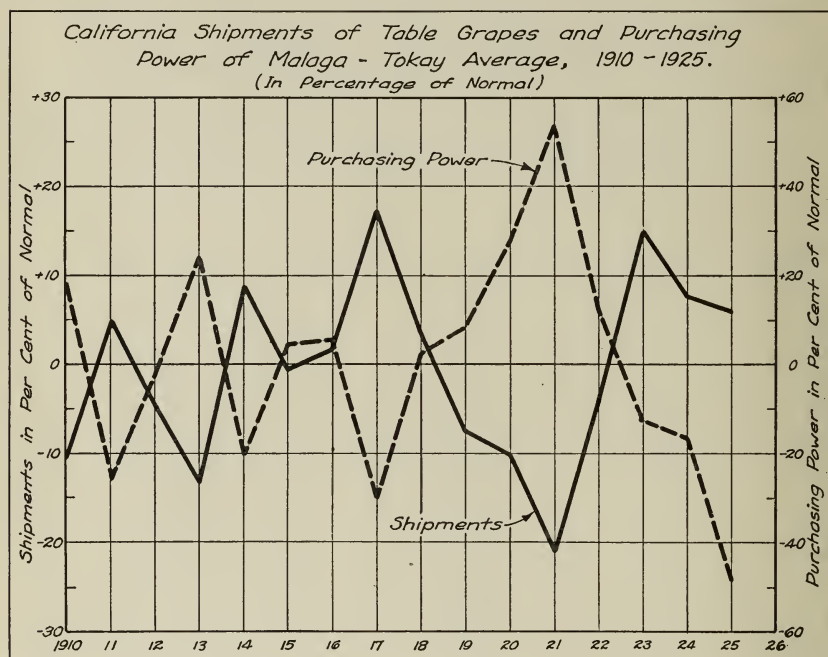
Fig. 25.—The fact that the purchasing power of table-grape varieties has in past years usually fallen below normal when shipments were above normal and vice versa, is a basis for predicting prices from forecasts of production and probable shipments.   (See footnote, p. 91, for source of data and method of computation.)

purchasing power per ton of eastern grapes showed no special trend either upward or downward from 1900 to 1917.   Very likely this fact was largely true of California table grapes during this whole period. From 1917 to 1921 both California and eastern-grape prices and purchasing power rose together with startling rapidity.   Since 1921 they

[45] The absolute prices shown in figure 24 may not be strictly comparable in any given year.   The price of California table grapes is an estimated f.o.b. price. Inquiry has failed to reveal, however, whether the Chautauqua-Erie figure is an f.o.b. or a farm price.   It is believed, however, that the Chautauqua-Erie price is reliably representative of the relative changes from year to year of the price of the bulk of eastern grapes.   Prices for 1904–1926 agreeing reasonably closely with those in table 19 are given by Stover, H. J.   Some Factors Affecting the Purchasing Power of Grapes.   Cornell Dept. Agr. Econ. and Farm Mgt., Farm Economics No. 45: 693.   June, 1927.

have both shown the same tendency to decline very rapidly, primarily because of the rapidly increasing commercial grape production.

Effect of Variations in Table-Grape Supply Upon Purchasing Power.—The two curves pictured in figure 25[46] show in a striking manner that since 1910 there has hardly been an exception to the rule that when shipments of table-grape varieties have risen above normal, purchasing power per ton has fallen below normal, or that vice versa, when shipments have fallen below normal, purchasing power has risen above normal. The inverse correlation between shipments of California table grapes and their purchasing power as pictured in this figure is — 0.823, indicating that 66 per cent of the variation in the purchasing power of table grapes can be accounted for by changes in shipments. This relationship is of considerable practical importance as a basis for forecasting what the price in a given season is likely to be as soon as estimates of probable production for that season are available.[47]

Table Varieties Fluctuate Together.[48]—The purchasing power of each of the four most important table varieties is shown separately in the four curves in the upper right hand corner of figure 26. The three upper lines which run so close together represent Malagas, Tokays, and Cornichons. The differences in the prices of the three have been very small compared with the differentials between wine varieties. Since 1921 Tokays have brought the highest average price in every year but one, and Malagas the lowest in all but two years. The fact that a large proportion of Malagas are shipped as juice stock probably accounts in part for their lower average price, since the quality of juice stock is, on the whole, lower than that of table stock.

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[46] Data plotted in figure 25 are percentage deviations from a line of trend fitted to the data from which table-grape shipments in table 8, page 46, were derived and from a simple average of the purchasing power of Malaga-Tokay grapes, 1910–1925, given in col. 17, table 18, page 86.

[47] The commercial value of better price forecasting is so obvious that there is no doubt that those interested in the grape industry will appreciate the desirability of fostering intensive studies of the factors that influence grape prices. California Experiment Station Bulletin 419 on the ''Economic Aspects of the Cantaloupe Industry,'' recently completed by Emil Rauchenstein of the Division of Agricultural Economics, illustrates the practical possibilities of measuring the factors determining the prices of perishable commodities. Dr. Rauchenstein has computed two regression equations. One makes it possible to forecast with considerable accuracy next year's probable cantaloupe acreage in the Imperial Valley on the basis of this year's average cantaloupe prices. The other enables shippers at any given time during the shipping season to forecast the probable wholesale price in New York City of Imperial Valley cantaloupes for the following week on the basis of estimated carlot receipts and maximum temperatures in that market.

[48] Lack of available data has made it necessary to omit the prices of Emperors. The authors would appreciate being put in touch with anyone having reliable series of prices for Emperors, in crates, kegs, or drums, for any or all of the years 1910 through 1926.
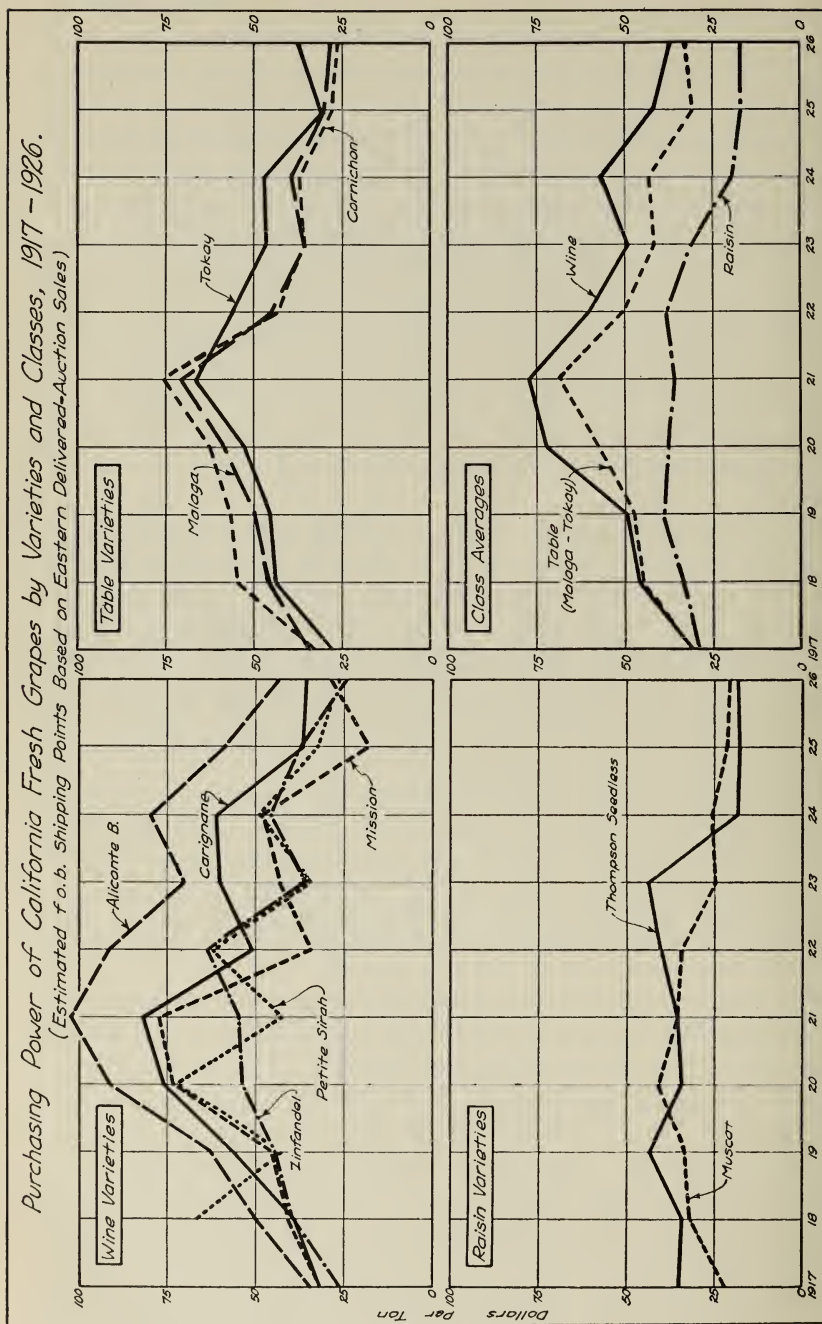
Fig. 26.—The purchasing powers of all varieties of California fresh grapes have tended to move up and down together since 1917. Raisin grapes, however, have consistently been the lowest in price. Wine and table-grape prices have moved together most uniformly, with wine grapes the highest from 1920 until 1926, in which year the purchasing power of both was practically the same. (Data from tables 18 and 25, pp. 86 and 120.)

Raisin Varieties.—The curves of the purchasing power of Muscats and Thompson Seedless, shown in the lower left-hand corner of figure 26, are much flatter than those for wine and table varieties. Likewise, there seems to be no apparent tendency for either one uniformly to bring more than the other. In some years Muscats have been higher in average price than Thompson Seedless, and in other years the reverse has been true.

Very few fresh raisin grapes were shipped to eastern markets before 1917, and hence the curve of raisin purchasing power, in figure 29, page 104, is the only indication of the trend of growers' returns prior to 1917. The curve in the lower right-hand corner of figure 26 showing the purchasing power of fresh raisin grapes brings out the fact that, of the three classes of grapes, raisin grapes have been the lowest in price in every year from 1917 to date. The relative flatness and smoothness of the raisin curve shows that fluctuations in the average annual price of raisin grapes have been smaller than have those in the prices of wine and table grapes. The differences in the price of Muscats and of Thompson Seedless, when averaged, have made a smoother curve than for either variety alone. From 1917 through 1923 the annual average f.o.b. California purchasing power per ton of fresh raisin grapes varied between $30 and $40, and for four years during this period it held steadily above $35. For the last three years it has been between $15 and $20 a ton only, in purchasing power, which, at the prevailing general price level, has meant an approximate f.o.b. price of between $25 and $30 a ton.[49]

Wine Varieties Fluctuate Together, with Alicante Highest.—With but few exceptions, the prices of each of the five chief wine-grape varieties, plotted in the upper left-hand corner of figure 26, have in general fluctuated up and down together. Alicante Bouschet, however, have consistently commanded a rather large differential over the other wine varieties. In 1922 this variety returned in purchasing power per ton over $25 more than the wine variety bringing the next

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[49] The following quotation from the Associated Grower (6⁸: 28, August, 1924) gives a basis for a rough comparison of returns for fresh raisin grapes with those from the raisins. ''About four tons of grapes having 24 per cent sugar will make one ton of raisins, if they are properly cured. If you are considering selling fresh, you must not forget the sugar percentage factor. If you pick your grapes and sell them when they have only 18 or 20 per cent sugar, it may take about five tons fresh to equal one ton cured; in other words, the five tons left on the vines until they had 24 per cent sugar would make nearly a ton and a quarter of raisins.

''In the matter of cost of harvest, it costs just about the same [probably somewhat more] to pick and deliver four tons of fresh grapes as it does to pick, turn, stack, box and haul one ton of raisins, so that four tons of fresh grapes with 24 per cent sugar sold at $20 a ton would bring you as much as 4 cents a pound for raisins. If you pick them with 18 to 20 per cent sugar and sell them for $20 per ton, they would net you about the same as 3¼ cents a pound for raisins.''

highest price. High returns to the grower of Alicante Bouschet have led to a more rapid increase in the production and shipments of this variety than of other wine varieties,[50] and as a result the price premium on this variety is tending to decrease. In 1926 Alicantes brought only about $10 a ton more than Carignanes, which, judging by its usual price, is the variety next in public favor for juice purposes.

Figure 26 shows that the eastern delivered-auction prices of wine and table grapes have moved up and down together rather consistently since 1917. The price of wine grapes has averaged above that of table grapes in every year since 1917. The rapid increase in shipments of wine-grape varieties in the last few years, however, will probably result in their price falling to about that of table-grape varieties within the next few years.

In comparing the f.o.b. price and purchasing power of wine and table-grape varieties it should be remembered that the cost of packing wine grapes in the field is substantially lower than the cost of packing table grapes in crates in the packing house. Some estimate that it costs $10 or $12 per ton more for the package and packing of table grapes in lidded crates than for the package and packing of wine grapes in unlidded lugs in the field. As a result, returns per ton to the grower at the ranch for wine grapes in lugs compared with table grapes in crates is more favorable by $10 or $12 than a comparison of the f.o.b. prices of wine grapes in lugs and table grapes in crates would indicate.

A comparison of the pre-war farm price and purchasing power per ton of wine grapes with those during the peak of high prices since the war makes it clear why California's plantings and shipments of wine grapes have been so greatly increased in the last few years. It is estimated[51] that the average farm price and purchasing power of wine grapes in California from 1909 to 1916 was approximately $10 per ton. The highest annual average price since the war is estimated at about $80 per ton in 1921, and of purchasing power over $50 per ton in terms of dollars of pre-war value. Returns to growers of Alicante Bouschet, it must not be forgotten, were much greater than even these high averages, in many instances almost beyond belief. The average estimated farm price of California wine grapes for the last eight years has been about $60 a ton, which has

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[50] For discussion see page 48.

[51] Estimates of farm prices for the years 1909–1918 are the authors' and for 1919–1926 are those of the California Crop Reporting Service. See California Crop Report for 1925, Calif. Dept. Agr. Spec. Pub. 63: 27. 1926, and Preliminary Summary of California Annual Crop Report for 1926: 3 (mimeo.) Jan. 5, 1927.

had a purchasing power equivalent of three or four times the average returns from 1909 to 1917.

The average farm price of California table varieties for the same eight years has been about $50, or somewhat less than that of wine varieties. The farm price of table grapes has, however, fallen much lower than that of wine grapes in the last few years. Estimates indicate that in 1925 the farm price of wine varieties averaged about $60, and in 1926 about $45, whereas table varieties averaged only between $20 and $25 a ton in these two years.

PRICE OUTLOOK AND PROBLEMS OF ADJUSTMENT

Forecast of the Bureau of Agricultural Economics.—The conclusions drawn from this study regarding the outlook for the United States grape industry are emphasized by those in the Agricultural Outlook for 1927,[52] which states that "grape production is expected to continue heavy, and it would seem unwise to set out new vineyards except where conditions are extremely favorable." In California "prospective production from vineyards which have not reached full bearing is so great . . . . that the problem of finding a satisfactory market during the next few years will probably continue difficult."

Danger of Judging the Future by the Present.—Both the high prices and the high purchasing power of grapes from 1919 through 1922 were largely responsible for undue expansion of grape acreage and production. With low prices and purchasing power of grapes in the past two years, the industry is reaping the effects of heavy plantings made during this period of high prices. The facts indicate that, at a time of abnormally high prices or purchasing power, it is likely to prove unprofitable to growers to expand acreage which will not come into full-bearing until several years in the future, when market prices are likely to be depressed by an increased harvest from young vines coming into bearing. It is obvious that because prices were high in 1921 was no reason to conclude that they would be high four or five years hence. Thousands, however, must have planted grape vines in 1921 on the assumption that grape prices were not likely to be much lower when these vines came into bearing.[53]

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[52] U. S. Bur. Agr. Econ. Staff. The agricultural outlook for 1927. U. S. Dept. Agr., Misc. Cir. **101**: 4, 34. February, 1927.

[53] In 1921 R. L. Nougaret, Viticulturist in the California Department of Agriculture, pointed out the serious probability of unprofitably low prices for raisin and table grapes in the near future as a result of rapidly expanding production and the small likelihood of a corresponding increase in demand. (Status of the California Grape Industry, June 30, 1921, pp. 14–22, 1922.)

Heavy Supplies of Fruit Consistently Tend to Depress Prices.—
The dominant influence of heavy supplies upon the market prices of
fruit is strikingly illustrated by the results of available analyses of
the statistics of the California fruit industry. That California raisin
prices tend to be low in years when supplies are large and high when
supplies are relatively small, is shown by figure 30, page 106. The
data pictured in figure 30, page 106, indicate that about 66 per cent
of the fluctuations in the purchasing power of California table grapes
are due to decreases or increases in market supplies. Rauchenstein[54]
has found a close correlation between New York prices of cantaloupes
and weekly average carlot receipts. Approximately 88 per cent of
the variations in average weekly prices for the years 1921 to 1926
are apparently accounted for by these factors. How closely the price
of all fruits is apparently affected by the production of all fruits is
well illustrated by the statistics of California's fruit and nut industry.
Preliminary computations by Rauchenstein indicate that in the last
eight years, 1919–1926, about 86 per cent of the variation in the
annual average purchasing power per ton of all California fruits and
nuts can be accounted for by changes in total state production of these
crops.

A knowledge of such relationships is of the greatest practical
value as a basis for stabilizing an industry. It makes it possible, as
soon as estimates of probable production are available, to forecast with
a considerable degree of success what the price is likely to be in any
particular season and, on the basis of such forecasts, to adjust farm
management and marketing practices to make the most of the fore-
casted situation. Likewise, by enabling one to see more clearly the
probable effect of future increases in supply upon future prices, it
provides a basis of forecasted facts of sufficient definiteness to justify
their use by growers and others in making adjustments in production
or marketing by which they can make the most of the unfavorable
financial outlook which many growers of California fruits appar-
ently face in the next few years.

The results of the studies mentioned indicate a marked tendency
for the purchasing power of most California fruits to fall appreciably
as the result of significant increases in supply. The seriousness of
this close inverse relationship between variations in California's fruit
output and the prices received by growers is evident when one con-
siders the fact that the bearing acreage of all fruits and nuts in the
state, including grapes, increased about 68 per cent from 1919 to 1926
and in 1929 promises to be probably 85 per cent greater than in 1919.

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[54] See page 91.
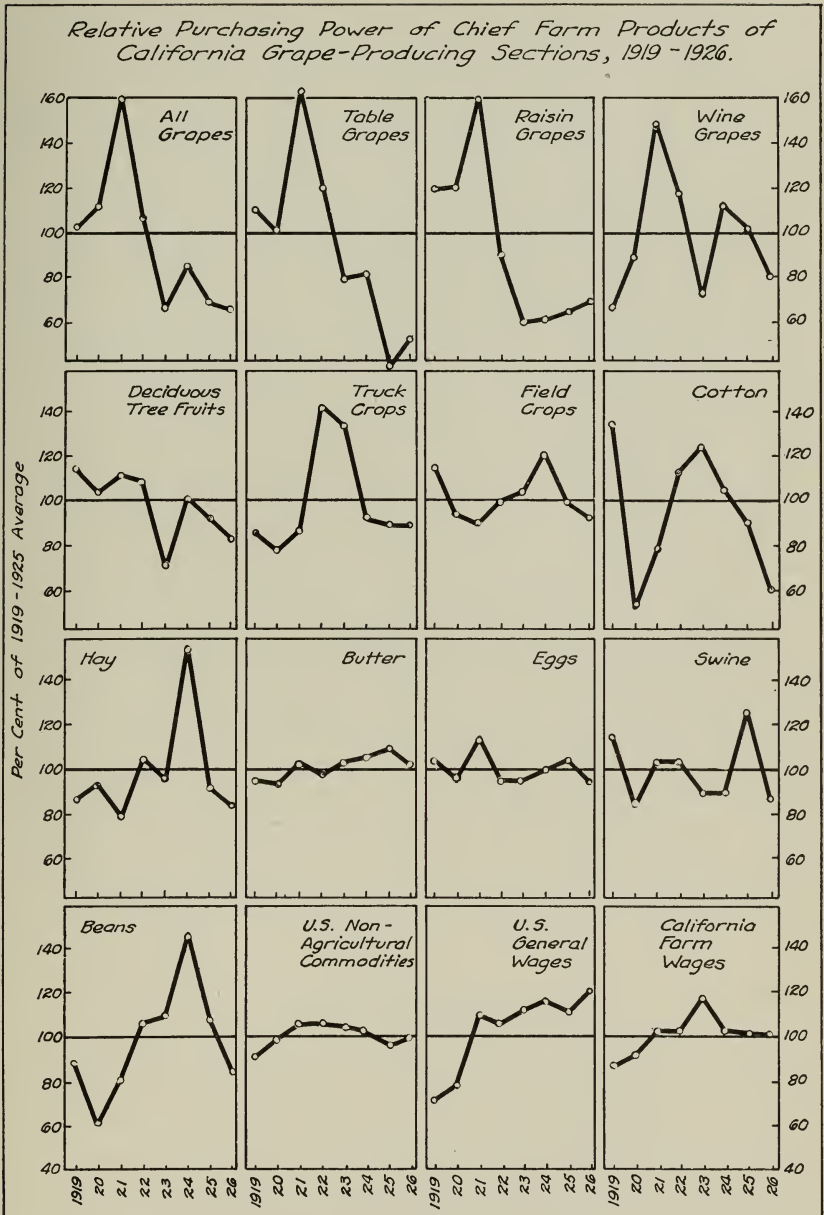
Fig. 27.—Plans for the adjustment of farm organization to changing economic conditions should recognize that in no year have the prices of all California's chief farm products been either high or low, nor has the price of any one product continually remained high or low. (Data from table 26, p. 122.)

Prices of Alternative Farm Products in California Grape Sections, 1919–1926.—Just what the grape grower should do, who finds himself unable to produce grapes at the low prices that have prevailed during the past two years and that are likely to prevail in the near future, is a serious and difficult problem. In order to make the most intelligent decisions, growers should have a reasonably good picture of the various alternatives which are open to them as individuals, and what the returns are likely to be. The market outlook in the near future is uncertain, however, for many of the farm products to which grape growers might turn in order partially and perhaps temporarily to relieve their financial difficulties. Many facts are needed which are not now available. Few realize how great is the task of securing the enormous body of truly adequate and relevant facts.

Figure 27 has been inserted to provide a general idea of the relative prices for the past eight years of some of the more important products that are grown in many of the grape-producing sections of the state. The most striking fact that the price curves bring out is that in no year have the prices of *all* the products pictured been either high or low. This fact suggests the possibility of growers making their incomes more nearly equal from year to year by a reasonable amount of diversification. A study of the price curves shown in figure 27 brings out the fact that the price of no product continually remains high. The prices of most farm products move in cycles, some products having cycles of different lengths than others. One cannot expect future prices necessarily to be what they have been in recent years. On the other hand, it is highly improbable that, in any given year, low prices would prevail for all of the crops which one might produce under a well-considered program of diversification.

THE RAISIN INDUSTRY

Close Relationship between Fresh-Grape and Raisin Industries.— Although this publication has to do primarily with the fresh-grape industry, a brief discussion of the economic situation of the raisin industry is included at this point as a basis for understanding how the fresh-grape industry and the raisin industry have influenced one another in the past, and how they are likely to influence one another in the future.

The California grape deal of 1925 well illustrates the close relationship between the welfare of the fresh grape industry and the raisin

industry. Three years of low prices for raisins, particularly Muscats, accompanied by good prices for wine grapes and an increasing use of Muscats for juice purposes, led to the shipment of between eight and ten thousand cars more raisin grapes to eastern markets in 1925 than in 1924. The early winter in the East cut the demand for grapes for wine-making purposes much earlier than usual. This fact, together with an increase of about 16,000 cars of all kinds of fresh-grape shipments, of which raisin grapes were well over one-half, was largely responsible for the serious slump in the prices of all varieties which occurred toward the end of the shipping season. On the other hand, the fact that over 30 per cent of the total raisin-grape output of the state was shipped fresh, reduced the raisin output of the state sufficiently to relieve the dried market materially and raise the price of raisins. As a result of their 1925 experience, growers shipped a considerably smaller proportion of their fresh raisin grapes east in 1926, resulting in a proportionally greater volume dried, especially since about 8,500 tons more Malaga raisins were produced than in 1925.[55]

Increasing Shipments of Fresh Raisin Grapes.—In addition to the major portion of the raisin-grape tonnage of the state accounted for as dried in figure 28, an increasingly large percentage of both Thompson Seedless and Muscats were shipped east in the fresh state from 1919 to 1925. This was largely a result of the great demand for juice grapes, coupled with the low prices which growers had been receiving for their dried product. The chief reason for the decline of the dried-Muscat output in 1925 to about 47,000 tons, or about half of the tonnage dried in 1923, was the use in the East of fresh shipments amounting to over 55 per cent of a total Muscat production which otherwise might have been about 110,000 dried tons, not including a considerable tonnage unharvested.

The increase in fresh shipments of Thompson Seedless (Sultanina) since the war has been less striking than that of Muscats. Approximately 8,000 cars, or about 18 per cent of the total production of this variety, was shipped fresh in 1925, in contrast with about 550 cars, or less than 3 per cent, in 1919. Had all of the Muscat and Thompson Seedless grapes which were shipped fresh in 1925 been converted to raisins, California's total dried output would have been about 295,000 tons instead of 200,000. Including the estimated tonnage of raisin grapes unharvested, California actually produced an equivalent of about 305,000 tons of raisins in 1925 and about 315,000 tons in 1926.

[55] Calif. Crop Report (mimeo.), Nov. 1, 1926:3.
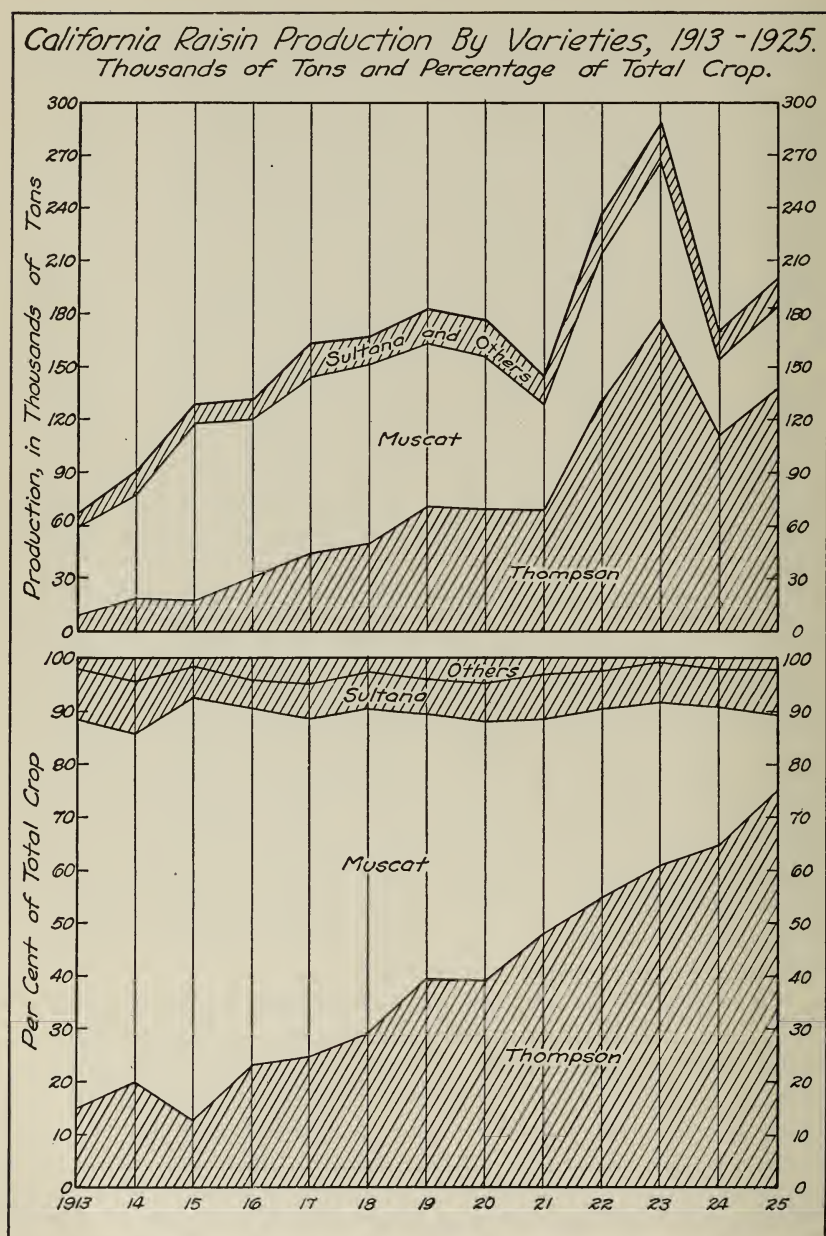
Fig. 28.—Although California's production of both Muscat and Thompson Seedless raisins has increased enormously since 1913, Thompson Seedless output has increased relatively much more rapidly than Muscats. Only 14 per cent of the raisin output in 1913 were Thompsons and in 1925 only 14 per cent were Muscats. (Data from table 20, p. 101.)

Rapid Increase in Thompson Seedless Raisins Compared with Muscats.—Estimates of the output of California raisins by varieties pictured in figure 28 show clearly the rapid increase in the production of Thompson Seedless grapes in the state since 1913 compared with Muscats. Thompson Seedless output rose from less than 10,000 tons—constituting only about 14 per cent of the total 1913 raisin crop—to nearly 177,000 tons in 1923, or 61 per cent of the largest raisin crop in the history of California. In the same period the Muscat output rose from about 49,000 tons to nearly 90,000 tons; but, whereas three-fourths of the state's raisin production were Muscats in 1913, only slightly over 30 per cent were Muscats in 1923. For the last three years, 1924–1926, the tonnage of both Thompson Seedless and Muscat raisins, although large, has been less than the 1923 output. The percentage of Thompson Seedless, however, rose to about 74 per cent of the state output in 1926, while Muscats fell to about 14 per cent, the same proportion that Thompson Seedless raisins were of the total output in 1913.

TABLE 20

CALIFORNIA PRODUCTION OF RAISINS, BY VARIETIES, 1913–1925

Year	Production in dried tons					Per cent of total production			
	Total	Thompson	Muscat	Sultana	Others	Thompson	Muscat	Sultana	Others
	1	2	3	4	5	6	7	8	9
1913........	66,000	9,200	49,300	6,100	1,400	13.9	74.8	9.2	2.1
1914........	91,000	18,000	60,000	9,000	4,000	19.8	65.9	9.9	4.4
1915........	128,000	16,300	102,300	7,300	2,100	12.7	80.0	5.7	1.6
1916........	132,000	30,500	89,000	7,000	5,500	23.1	67.4	5.3	4.2
1917........	163,000	40,500	104,000	10,500	8,000	24.8	63.9	6.4	4.9
1918........	167,000	48,800	102,500	11,700	4,000	29.2	61.4	7.0	2.4
1919........	182,500	71,900	91,800	11,700	7,100	39.4	50.3	6.4	3.9
1920........	177,000	69,500	86,500	12,700	8,300	39.2	48.9	7.2	4.7
1921........	145,000	69,500	58,900	12,200	4,400	48.0	40.6	8.4	3.0
1922........	237,000	130,100	84,600	16,900	5,400	54.9	35.7	7.1	2.3
1923........	290,000	176,900	89,600	21,900	1,600	61.0	30.9	7.6	0.5
1924........	170,000	110,200	44,200	12,200	3,400	64.8	26.0	7.2	2.0
1925	200,000	152,000	28,000	14,000	6,000	76.0	14.0	7.0	3.0
1926*.....	260,000								
1927........									

* Data for 1926 are preliminary and subject to revision.

Sources of data:
Col. 1. Years 1913–1918 from Associated Grower 5[1]:16. Jan., 1923. Years 1919–1924 from California Crop Report for 1925, p. 26. Years 1925–1926 from mimeographed Summary of California Annual Crop Report for 1926 issued Jan. 5, 1927.
Cols. 2 to 5. Years 1913–1921 from Associated Grower 5[1]:16. Jan., 1923, except that figures for 1919–1921 were converted to percentages and applied to the totals given in col. 1. Year 1922, data from California Fruit News, Feb. 3, 1923, p. 3, converted to percentages and applied to totals in col. 1. Year 1923, col. 5, from Nougaret, R. L. California Grape Situation in 1924 (Calif. Dept. Agr. Spec. Pub. 47:22. 1924) converted to percentages of total crop; balance of crop allocated to varieties on basis of data from Sun-Maid Business, Feb. 15, 1926, p. 4. Year 1924, col. 5, estimated as a maximum of 2 per cent of total crop; remainder of crop apportioned according to figures from Sun-Maid Business, June 15, 1926, p. 5. Year 1925, calculated by applying the percentages in cols. 6–9 to col. 1. These percentages for 1925 apply to the portion of the crop handled by the Sun-Maid Raisin Growers.

High Thompson Seedless Prices Have Caused Rapid Increase in Production.—A comparison of the prices California growers have received for Muscat and Thompson Seedless raisins from 1909 to date as shown in table 21, page 105, discloses the chief reason why Thompson Seedless production has increased between ten and fifteen fold since 1913, while Muscat production has not even doubled. The growers' returns from Thompson Seedless raisins during this period have consistently been several dollars more per ton than from Muscats. During the peak of astoundingly high raisin prices in 1919, 1920, and 1921, Thompson Seedless averaged the grower over $40 a ton more than Muscats. The demand for Thompson Seedless for fresh consumption has also greatly exceeded that for Muscats, which variety, until recently, has been considered almost entirely as a juice grape when shipped fresh.[56]

Statistical Story of California Raisin Industry, 1909–1926.[57]—In order to visualize adequately the probable outlook for the fresh-grape industry of California, it is necessary to study what has happened and what is likely to happen to the raisin industry, not only of this state, but also of the world. The close relationship between the welfare of our fresh-grape industry and of the raisin industry makes such a consideration essential to intelligent planning and readjustments in both industries. A survey of the statistical story of the raisin industry of the state from 1909 to date as shown in figures 28, 29 and 30, pages 100, 104 and 106, will help to make clear why raisin growers have found themselves in such a precarious financial situation since 1922, when raisin prices dropped so low. It will also throw light on the causes of the rapidly increasing shipments of fresh raisin grapes to our eastern markets in recent years. The effect of raisin prices on production, exports, imports, and consumption from 1909 to date,

[56] Schultz, C. E. California Grape Deal for 1925: 4. (mimeo.) July, 1926.

[57] *Sources of Raisin Data before 1909.*—A chart showing curves of United States production and imports of all raisins, 1872–1925; exports, 1898–1924; and of seeded-raisin production, 1896–1924 is given in the United States Department of Agriculture Yearbook for 1925, page 282, in an article on grape production in the United States, by George C. Husmann. The actual data, however, do not accompany this figure. The 1911 number of the Statistical Report of the California State Board of Agriculture, pages 152–155, gives:

(1) Annual estimates of the seeded raisin output of the state, 1896–1911;

(2) The quantity and value of raisin imports into the United States annually, 1851–1868 and 1884–1911;

(3) The quantity and value of currant imports annually, 1851–1868 and 1891–1911; and

(4) The quantity and value of raisin exports from the United States annually, 1898–1911.

Imports and exports for recent years are conveniently compiled in the United States Department of Agriculture Yearbooks and in the Annual Statistical Review numbers of the California Fruit News.

and the reverse effect of these same factors on prices are the most significant relationships shown in the pictures under consideration.

Post-War Inflation of Raisin Prices and the Following Depression.—The purchasing power per ton of raisins, shown in figure 29 in terms of dollars of pre-war value, manifested a tendency to decline from 1911 to 1918. Production and consumption during the same period were rising rapidly, and apparently more rapidly than domestic demand at stable prices, judging by the declining purchasing power of raisins and the increasing volume of exports. The outlook for the raisin industry in 1918 did not seem to justify marked expansion of acreage and production unless growers were able to produce with profit at the prevailing purchasing power or slightly lower. However, as a result of the war the Turkish raisin crop was temporarily removed from the world market, and prohibition suddenly and greatly stimulated the demand at home, resulting in inordinately high prices for the three years 1919–1921.

Unmindful of the fact that there was little assurance of being able to continue selling an increasing output at such profitable prices, thousands plunged blindly into raisin-grape planting or land speculation. In the meantime, the exorbitant prices almost did away with the large domestic bakery demand for raisins; thousands of consumers turned to cheaper food; exports dropped greatly, and imports, which undersold the unjustifiably high prices for which many growers were holding, grew from 8,000 tons in 1919 to 23,000 in 1920; domestic sales decreased so greatly that one-third to one-half of the crops of 1921–1924 remained unsold as a carryover on June first to break the following season's market.

The so-called "15-cent" raisin prices of 1921 fell to about 3 cents and prices have remained unprofitably low much of the time since. Such a reduction was necessary in order to dispose of 40 per cent more California raisins than have ever been sold in any previous four-year period in the history of the state's industry. The net result has been that the year 1926 is the fifth in succession in which California raisins have been considerably lower in purchasing power than they were before the war. The unreasonably high prices for which California raisins were held in 1919, 1920, and 1921, largely accounts for the stimulation of world production which has resulted in the serious depression which raisin growers the world over have been passing through since 1922. The three-year inflation of raisin prices from 1919 to 1921 cost raisin growers literally millions of dollars.[58]

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[58] See Sun-Maid Business, Dec. 15, 1924, p. 17.

Fig. 29. (For explanation see bottom of p. 105.)

TABLE 21

Farm Price and Purchasing Power of California Raisins, by Varieties,
1909–1926

Crop year	Price						All-commodity wholesale price index	Purchasing power		
	Muscat	Thompson	Sultana	Average				Average		Per cent of 1910–14 average
	Per ton Dollars	Per ton Dollars	Per ton Dollars	Per ton Dollars	Per pound Dollars	Per cent of 1910–14 average		Per ton Dollars	Per pound Dollars	
1	2	3	4	5	6	7	8	9	10	11
Average 1910–14..........	65.48	81.16	67.09	68.26	.0341	100	100	68.20	.0341	100
1909........................	32.50	42.50	30.00	33.69	.0168	49	103	32.80	.0164	48
1910........................	55.00	60.00	50.00	55.25	.0276	81	97	57.00	.0285	84
1911........................	75.00	107.50	87.50	80.81	.0404	118	99	81.60	.0408	119
1912........................	61.84	67.50	55.00	62.17	.0308	90	102	60.40	.0302	88
1913........................	69.30	78.28	65.66	70.23	.0351	103	101	69.60	.0348	102
1914........................	66.26	92.50	77.28	72.83	.0364	106	101	72.00	.0360	105
1915........................	72.72	99.67	88.81	76.91	.0385	113	120	64.20	.0321	94
1916........................	84.18	131.51	118.10	95.47	.0477	139	171	55.80	.0279	82
1917........................	97.04	137.73	130.89	109.97	.0550	161	193	57.00	.0285	83
1918........................	105.40	137.89	134.54	116.99	.0589	171	206	56.80	.0284	83
1919........................	207.68	239.97	238.65	222.22	.1111	325	236	94.20	.0471	138
1920........................	223.05	295.45	242.65	252.21	.1261	369	164	154.00	.0770	225
1921........................	145.95	168.08	162.20	157.79	.0785	230	148	107.00	.0530	155
1922........................	53.09	72.45	66.26	63.64	.0318	93	158	40.30	.0201	59
1923........................	50.16	48.78	46.90	49.08	.0245	72	153	32.10	.0161	47
1924........................	60.50	61.93	45.02	60.32	.0302	88	161	37.40	.0187	55
1925........................				75.00	.0375	110	157	47.80	.0239	70
1926........................				75.00	.0375	110	154	48.80	.0244	72
1927........................										

Sources of data:
Col. 1.   The dates refer to the years in which the crops for which prices are given were harvested.
Col. 2–6.   True or weighted average prices paid to growers for raisins in the sweat-box, not including returns on bleached raisins and distillery or other converted stock.   Years 1909–1912, from Sun-Maid Herald, Sept., 1916, p. 2, and Calif. Fruit News, July 29, 1916, p. 1.   The 1912 price includes, also, the returns to growers on approximately one-fourth of the 1912 crop sold by the Sun-Maid Raisin Growers in 1913 (see Sun-Maid Herald, Nov., 1915, p. 5, and Sun-Maid Raisin Growers, Cooperative Marketing and the Raisin Industry, p. 5, mimeographed circular, 1922).   Years 1913–1924 are Sun-Maid's returns to its members.   Years 1913–1921 from Associated Grower, Jan., 1923, p. 16.   Years 1922–1924 from unpublished data furnished by Sun-Maid Raisin Growers of California.   Years 1925 and 1926 preliminary estimates by the authors.
Cols. 5, 6.   Weighted average of prices in cols. 2–4.   Weights used for the years 1913–1925 are the quantities of each of the three varieties given in table 20, page 101.   The 1913 weights are used for the years 1909–1912.
Col. 7.   Prices in cols. 5 and 6 expressed as relatives or percentages of the average price for the five crop-years 1910–1914 used as 100 per cent.
Col. 8.   U. S. Bureau of Labor Statistics monthly all-commodity wholesale price index for the United States (for 404 commodities in recent years) converted to a crop-year basis (Oct.-Sept.) and expressed as a relative or percentage of the five-year average, Oct., 1910 to Sept., 1915, inclusive, as 100. Years 1909–1923 from Warren, G. F., and F. A. Pearson, The Agricultural Situation, p. 66.   N. Y., Wiley & Sons, 1924.   Years 1924–1926 from U. S. Bur. of Agr. Econ., Agricultural Situation 11[2]:8.   Feb. 1, 1927.
Cols. 9, 10.   Computed by dividing each item in cols. 4 and 5 by the corresponding item in col. 8. See discussion of meaning and significance of purchasing power on page 87.
Col. 11.   Purchasing power in cols. 9 and 10 expressed as relatives or percentages of their respective averages for the five crop-years 1910–1914, as 100.

Fig. 29.—Unjustifiably high prices for California raisins from 1919 through 1921 stimulated imports and plantings, reduced exports, and temporarily decreased the consumption of California raisins, resulting in several years of unprofitable prices, and in June carryovers amounting to from one-third to one-half of the crops of 1921–1924.   (Data from tables 21 and 27, pp. 105 and 124.)

Inverse Relationship Between Raisin Supply and Price.—The picture presented in figure 30 illustrates the fact that normally raisin prices are low when production is unusually heavy, and are high when production is abnormally light. It also shows, however, that these results do not always follow. Low raisin prices from 1922 through 1925 were not caused alone by heavy production, but also by large carryovers which should have been avoided by setting the price right, i.e., low enough to move each crop by the time the next one was ready to market. The history of raisin prices in the last ten years illustrates
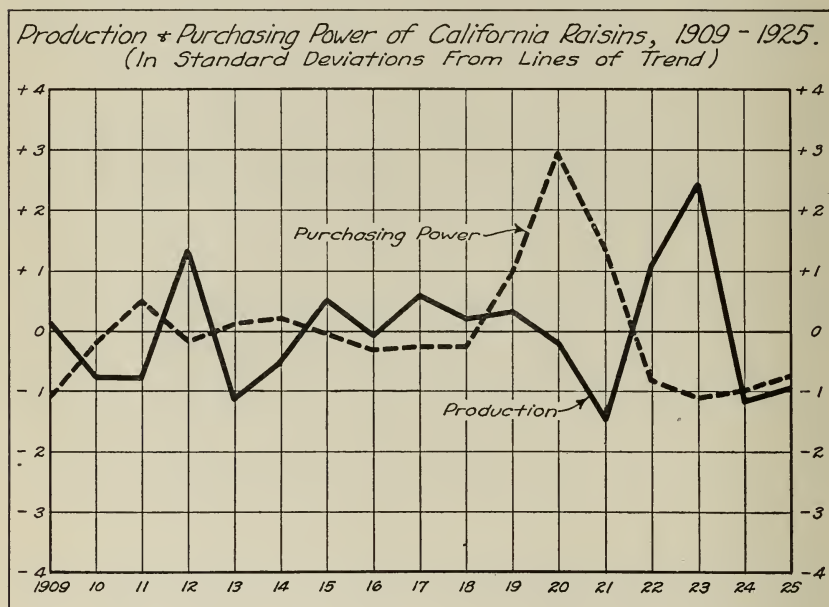
Fig. 30.—Raisin prices tend to be low when production is large and vice versa, except when other important influences such as heavy carryovers upset the market. (Calculated from data in tables 21 and 27, pp. 105 and 124, by method described in Mill, F. C. Statistical method: 154–158. Holt and Co., New York. 1924.)

in a striking way the fact that violent price changes in one direction are very likely to result in violent swings in the other direction. Going into an industry because prices are very high is more than likely to bring disappointment, particularly in the fruit industry.

World Conditions Determine California's Raisin Market.—The market for raisins, unlike that for many other fruits, is world-wide. California's raisins are, therefore, sold at a price largely determined by world conditions of supply and demand. Although California is the only raisin-producing state in the Union, and by **far a larger**

producer than any separate country, her output in recent years has probably not been over 40 per cent of the world output of raisins and currants. These conditions make it necessary for our raisin-grape grower to consider carefully the world-wide status of the raisin industry in arriving at reasonable conclusions in regard to expanding or contracting production and in determining the amount of effort which should be devoted to extending both domestic and foreign markets.

Status and Outlook of the World Raisin Market Is Unfavorable.—The very rough estimates of world production of raisins which are available indicate that the average total world output of raisins and currants in recent years has been about 500,000 tons.[59] Compared with the approximate average pre-war output, world production has increased about 25 per cent. Data regarding the world situation of, and outlook for, the raisin industry are rather meagre and of doubtful accuracy. However, an analysis based upon these data appears to warrant the conclusion that a normal world crop of raisin grapes in the next few years is not likely to be smaller than the average production of recent years and may be even greater. The British Imperial Economic Committee apparently holds a similar belief when it states that ''the surplus output from California threatens to keep prices depressed for some time to come. Therefore those producers, whether within or without the Empire, who produce fruit of substantially the same quality as California cannot reasonably hope for satisfactory returns during the next few years.''[60]

Higher Prices Chiefly Dependent on Reduced Production.—It is difficult to concur with the British Committee in its apparent implication that California alone is responsible for the *world* surplus of raisins which is depressing prices, since a considerable expansion of the industry has taken place outside of California. It would seem, however, that its emphasis on increased production as the chief cause of low raisin prices is fundamentally sound, and that a reduction of the world's output of raisins and currants is necessary if substantially higher prices are to be expected. Since California is producing about 40 per cent of the world output, if such a decrease is necessary, a part of it should probably take place in California.

[59] Reliable statistics on raisin and currant production are unavailable in most foreign producing countries. The estimates of world production by countries used here are based on data supplied by the United States Bureau of Foreign and Domestic Commerce and the United States Bureau of Agricultural Economics. See also Sun-Maid Business, Oct. 15, 1924, p. 9.

[60] Great Britain, Imperial Economic Committee. Report on the marketing and preparing or market of foodstuffs produced in the overseas parts of the Empire, Third Report—Fruit: pp. 171–172. 1926.

Rapid Expansion of Australian Raisin Production.—The question of reduction in acreage and production in California is further suggested by the fact that Australia is trying to appropriate California's British raisin business. Since the war, Australia's production of raisins and currants has increased very rapidly and is now three times its pre-war output. Her average production of raisins in recent years is about 40,000 tons, which is nearly large enough to replace all of California's exports to Canada and the British Isles. Likewise a further "considerable increase in production . . . . may be expected from the vines already planted."[61] In addition, great potential increases in production on newly developed irrigation projects are possible in both Australia and South Africa, under adequate financial stimulus.

Canadian and English Preferential Tariffs Favor Australia.—The menace of Australia's rapidly increasing output to California's raisin growers is not fully driven home until it is understood that Australia has recently consummated commercial treaties with both Canada and England, whereby Australian raisins may be imported into these countries with no import duty whatever, while importations of California raisins into Canada are taxed 3 cents a pound and into England 1.7 cents.[62] The extent to which Australia has succeeded to date in capturing British markets is shown by the fact that her exports of raisins and currants into the United Kingdom almost doubled from 1923 to 1925, increasing from 14,600 tons to over 23,000.[63] In 1924 and 1925 she supplied almost one-third of the total raisin imports into the British Isles, whereas before the war she contributed less than 1 per cent.[64] In view of the fact that, of the one-fourth of California's output which it has been necessary to export in the past four years, the British have taken over 70 per cent, any substantial expansion of Australian sales in England may be of considerable significance to Californians.

Keener Competition from Other Foreign Countries.—Increasingly keen competition with foreign raisin and currant producers is being felt not only from Australia, but also from nearly every one of five other important competitors—Greece, Persia, Smyrna, Spain, and South Africa. One or two of these countries have increased their

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[61] *Op. cit.*, p. 170.

[62] U. S. Dept. Agr. Foreign Crops and Markets **11**: 939. Sept. 21, 1925.

[63] U. S. Bur. Agr. Econ. Foreign News on Fruit F. S. F.-12 (mimeo.) Dec. 17, 1925.

[64] Great Britain, Imperial Economic Committee. Report on the marketing and preparing for market of foodstuffs produced in the overseas parts of the Empire, Third Report—Fruit. p. 169. 1926.

raisin and currant output slightly in recent years, although the trebling of production in California and Australia has largely been responsible for the 25 per cent post-war increase in world production. Each of these countries, however, feels keenly the necessity for greater sales effort to maintain its share of the world's trade. Profiting by the example of Sun-Maid's very effective sales campaigns in recent years, nearly every one of them has undertaken, or is preparing to launch, organized effort to improve the quality of its product and to increase the effectiveness of distribution.[65]

Increasing Exports and Decreasing Imports.—In spite of a greatly increased consumption of raisins in the United States during the last four years, importations of foreign raisins and currants have declined markedly until the annual average has been but slightly over 12,000 tons—not quite 70 per cent of pre-war imports. (See fig. 29 and table 27, p. 104.) California raisin growers, on the other hand, have multiplied their pre-war exports by almost five, in addition to supplying the greatly increased home consumption. During this time an average of over 54,000 tons of California raisins have moved each year to foreign markets. Practically one-fourth of our total production is now exported, whereas only 15 per cent of a much smaller output went abroad before the war. (See fig. 29 and table 27, p. 104.)

Increasing Difficulty of Expanding Foreign Markets.—The notable increase in California's raisin exports in the last five years should not be looked upon by producers as warranting expansion of production in the belief that further extension of foreign markets on any considerable scale is likely to be brought about profitably. Sales efforts which have lead to an effective expansion of foreign demand for California raisins,[66] are meeting constantly keener competition and resistance abroad, for reasons which have already been mentioned. Such opposition is likely to mean that continued endeavor and expense will be necessary merely to maintain our present foreign markets, and that proportionately greater effort will be required if a stronger foothold is to be had in many of the best European markets.

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[65] *Op. cit.* p. 163–187, and various numbers in recent years of Foreign Crops and Markets, a mimeographed weekly publication of the Bureau of Agricultural Economics, U. S. Department of Agriculture, and Foodstuffs 'Round the World: Dried and Canned Fruits, a mimeographed weekly publication of the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.

[66] See Sun-Maid Business, April 15, 1926: 1, 4, 12; Aug. 15, 1926: 1, 12 and Sunland Sales Cooperative Association Yearbook, 1926: 6–7, 13, for outstanding accomplishments in expanding foreign markets for Sun-Maid raisins.

APPENDIX OF TABLES

TABLE 22

Estimated California Wine Grape Production, by Uses, 1899–1918

Vintage year	Crop utilization				Production equivalent of fresh fruit				
	Dry wine	Sweet wine	Brandy	Fresh shipments	Dry wine	Sweet wine	Brandy	Fresh shipments	Total
1	2	3	4	5	6	7	8	9	10
	Gals.	Gals.	Proof gals.	Cars	Tons	Tons	Tons	Tons	Tons
1899	15,000,000	7,211,280	3,061,363	....	100,000	48,075	87,468	....	235,543
1900	13,000,000	7,872,756	3,257,631	....	86,667	52,485	93,075	....	232,227
1901	33,600,000	7,977,878	3,576,879	....	224,000	53,186	102,197	....	379,383
1902	18,500,000	13,762,863	5,771,400	....	123,333	91,752	164,897	....	379,982
1903	16,000,000	11,628,362	4,543,413	....	106,667	77,522	129,812	....	314,231
1904	18,000,000	11,263,251	4,653,141	....	120,000	75,088	132,947	....	328,035
1905	29,000,000	9,824,847	3,889,267	....	193,333	65,499	111,122	....	369,954
1906	26,800,000	13,282,887	5,462,052	....	178,667	88,553	156,059	....	423,279
1907	27,700,000	14,057,111	6,433,411	....	184,667	93,714	183,812	....	462,193
1908	33,900,000	12,235,307	5,971,171	....	226,000	81,569	170,605	....	478,174
1909	27,400,000	15,408,846	7,170,212	....	182,667	102,726	204,863	....	490,256
1910	26,000,000	15,933,511	7,316,488	....	173,333	106,223	209,043	....	488,599
1911	25,000,000	19,997,490	8,721,693	....	166,667	133,317	249,191	....	549,175
1912	22,000,000	15,257,269	7,472,562	....	146,667	101,715	213,502	....	461,884
1913	25,000,000	14,857,271	6,765,119	....	166,667	99,048	193,289	....	459,004
1914	26,300,000	14,377,034	7,906,380	....	175,333	95,847	225,897	....	497,077
1915	21,571,000	11,914,575	3,779,532	750	143,807	79,431	107,987	10,500	341,725
1916	23,000,000	17,599,916	7,871,759	835	153,333	117,333	224,907	11,690	507,263
1917	20,020,000	15,001,466	5,295,952	4,000	133,467	100,010	151,313	56,000	440,790
1918	25,000,000	6,324,044	1,765,906	6,000	166,667	42,160	50,454	84,000	343,281

Sources of data:

Col. 1. All data, except where noted, are for the 12 months ending June 30 of the year following that indicated in col. 1.

Col. 2. Years 1899–1912 and 1914 compiled from Calif. State Brd. Agr. Statistical Reports for the years 1912–1915. Years 1913, 1915, and 1916 compiled from State Brd. Viticultural Commissioners, Buls. 1–10, 1914–1918. Years 1917–1918 from Nougaret, R. L., Status of California grape industry, June 30, 1922. Calif. Dept. Agr., Spec. Pub. 28:15. 1922.

Col. 3. Includes only the amount of dry wine used before fortification. Years 1900–1918 compiled from U. S. Commissioner of Internal Revenue, Annual Reports 1900–1918. Year 1915 also includes an estimate of 6 million gallons of sweet wine made by a process not requiring fortification; data from State Board of Vit. Comms. Bul. 6:9, April 5, 1916.

Col. 4. Total brandy produced in California. All data compiled from U. S. Comm. of Int. Revenue Annual Reports 1900–1918.

Col. 5. Total interstate shipments of wine grapes by calendar years compiled from the following sources: Years 1915–1916 from State Brd. Vit. Comms. Bul. 6:8, April 5, 1916, and Bul. 8:1, Feb. 15, 1917. Years 1917–1918 from Nougaret, R. L., Status of California grape industry, June 30, 1922, p. 16. 1922.

Col. 6. Data in col. 2 divided by 150.

Col. 7. Data in col. 3 divided by 150.

Col. 8. Data in col. 4 divided by 35.

Col. 9. Total of cols. 6, 7, and 8.

The tonnage of wine grapes unharvested and those dried and converted into unfermented juice are not included in this estimate because of the lack of continuous series of satisfactory estimates. These estimates include a varying and, at times, considerable tonnage of lower grade raisin and table grapes used in the manufacture of wine and brandy.

TABLE 23

UNLOADS OF GRAPES, TOTAL FROM ALL STATES AND FROM CALIFORNIA BY CHIEF CITIES AND GROUPS, 1924-1926

1924

Geographic division	From all states			From California				From all states but California			
	Unloads cars	Per cent of unloads	Per cent of U. S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Grand total	48,892	100.0	69.9	41,891	100.0	72.0	86	7,001	100.0	57.2	14
Divisions 1-4	43,758	94.6	62.4	37,229	88.8	64.1	85	6,529	93.3	53.4	15
1. New England	4,822	9.9	6.9	4,068	9.7	7.1	84	754	10.8	6.2	16
Boston	4,425	9.1	6.3	3,798	9.1	6.6	86	627	9.0	5.1	14
Providence	397	0.8	0.6	270	0.6	0.5	68	127	1.8	1.1	32
2. Middle Atlantic	24,290	49.7	34.5	21,213	50.5	36.8	87	3,077	44.0	25.1	13
Buffalo	643	1.3	0.9	607	1.4	1.1	94	36	0.5	0.3	6
Newark	2,576	5.3	3.4	2,364	5.6	4.1	92	212	3.0	1.7	8
New York	14,444	29.6	20.7	13,502	32.1	23.4	93	942	13.5	7.7	7
Philadelphia	4,066	8.3	5.8	3,079	7.4	5.3	76	987	14.1	8.0	24
Pittsburgh	2,561	5.2	3.7	1,661	4.0	2.9	65	900	12.9	7.4	35
3. East North Central	12,477	25.5	17.9	10,375	24.8	17.4	83	2,102	30.0	17.2	17
Cincinnati	552	1.1	0.8	353	0.8	0.6	64	199	2.8	1.6	36
Cleveland	1,789	3.7	2.6	1,488	3.6	2.6	83	301	4.3	2.5	17
Columbus	217	0.4	0.3	155	0.4	0.3	71	62	0.9	0.5	29
Detroit	1,160	2.4	1.7	1,024	2.4	1.8	88	136	2.0	1.1	12
Toledo	334	0.7	0.5	122	0.3	0.2	37	212	3.0	1.7	63
Chicago	7,196	14.7	10.3	6,511	15.5	10.8	91	685	9.8	5.6	9
Indianapolis	168	0.3	0.2	110	0.3	0.1	65	58	0.8	0.5	35
Milwaukee	1,061	2.2	1.5	612	1.5	1.0	58	449	6.4	3.7	42
4. West North Central	2,169	4.5	3.1	1,573	3.8	2.8	73	596	8.5	4.9	27
Kansas City	471	1.0	0.7	400	1.0	0.7	85	71	1.0	0.7	15
Omaha	278	0.6	0.4	265	0.6	0.5	95	13	0.2	0.1	5
St. Louis	911	1.9	1.3	613	1.5	1.1	67	298	4.3	2.4	33
Minneapolis	304	0.6	0.4	153	0.4	0.3	50	151	2.2	1.2	50
St. Paul	205	0.4	0.3	142	0.3	0.2	69	63	0.9	0.5	31

TABLE 23—(Continued)

Geographic division	From all states			From California				From all states but California			
	Unloads cars	Per cent of unloads	Per cent of U. S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Divisions 5–7	**1,733**	**3.4**	**2.6**	**1,390**	**3.4**	**2.4**	**80**	**343**	**4.9**	**2.8**	**20**
5. South Atlantic	**983**	**1.9**	**1.4**	**771**	**1.9**	**1.3**	**68**	**212**	**3.0**	**1.7**	**22**
Atlanta	122	0.2	0.2	119	0.3	0.2	98	3	0.0	0.0	2
Baltimore	656	1.3	0.9	535	1.3	0.9	82	121	1.7	1.0	18
Washington, D. C.	205	0.4	0.3	117	0.3	0.2	57	88	1.3	0.7	43
6. East South Central	**388**	**0.8**	**0.6**	**264**	**0.6**	**0.5**	**68**	**124**	**1.8**	**1.0**	**32**
Birmingham	103	0.2	0.2	92	0.2	0.2	89	11	0.2	0.1	11
Louisville	211	0.4	0.3	150	0.4	0.3	71	61	0.9	0.5	29
Memphis	74	0.2	0.1	22	0.0	0.0	30	52	0.7	0.4	70
7. West South Central	**362**	**0.7**	**0.6**	**355**	**0.9**	**0.6**	**98**	**7**	**0.1**	**0.1**	**2**
Fort Worth	47	0.1	0.1	45	0.1	0.1	96	2	0.0	0.0	4
Dallas	115	0.2	0.2	112	0.3	0.2	98	3	0.1	0.0	3
New Orleans	200	0.4	0.3	198	0.5	0.3	99	2	0.0	0.0	1
8. Mountain	**376**	**0.8**	**0.5**	**296**	**0.7**	**0.5**	**79**	**80**	**1.1**	**0.6**	**21**
Denver	295	0.6	0.4	220	0.5	0.4	75	75	1.0	0.6	25
Salt Lake City	81	0.2	0.1	76	0.2	0.1	94	5	0.1	0.0	6
9. Pacific	**3,025**	**6.2**	**4.4**	**2,976**	**7.1**	**4.9**	**98**	**49**	**0.7**	**0.4**	**2**
Spokane	49	0.1	0.1	28	0.1	0.0	57	21	0.3	0.2	43
Seattle	245	0.5	0.4	220	0.5	0.4	90	25	0.4	0.2	10
Portland	310	0.6	0.4	309	0.7	0.5	100	1	0.0	0.0	0
San Francisco	2,164	4.4	3.1	2,164	5.2	3.6	100	0	0.0	0.0	0
Los Angeles	257	0.5	0.4	255	0.6	0.4	99	2	0.0	0.0	1

TABLE 23—(Continued)

1925

Geographic division	From all states			From California				From all states but California			
	Unloads cars	Per cent of unloads	Per cent of U.S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Grand total	**55,405**	**100.0**	**67.8**	**52,385**	**100.0**	**69.6**	**95**	**3,020**	**100.0**	**50.5**	**5**
Divisions 1–4	**49,055**	**88.7**	**59.9**	**46,363**	**88.6**	**61.4**	**95**	**2,692**	**89.1**	**45.1**	**5**
1. New England	**5,689**	**10.3**	**6.9**	**5,524**	**10.5**	**7.3**	**97**	**165**	**5.5**	**2.8**	**3**
Boston	5,242	9.5	6.4	5,100	9.7	6.8	97	142	4.7	2.4	3
Providence	447	0.8	0.5	424	0.8	0.6	95	23	0.8	0.4	5
2. Middle Atlantic	**28,563**	**51.7**	**34.8**	**27,273**	**52.2**	**36.1**	**95**	**1,290**	**42.7**	**21.7**	**5**
Buffalo	763	1.4	0.9	759	1.4	1.0	100	4	0.1	0.0	0
Newark	2,807	5.1	3.4	2,737	5.2	3.6	98	70	2.3	1.2	2
New York	17,078	31.0	20.9	16,635	31.9	22.0	97	443	14.7	7.4	3
Philadelphia	4,946	8.9	6.0	4,591	8.8	6.1	93	355	11.8	6.0	7
Pittsburgh	2,969	5.3	3.6	2,551	4.9	3.4	86	418	13.8	7.1	14
3. East North Central	**12,689**	**23.0**	**15.6**	**11,646**	**22.2**	**15.4**	**92**	**1,043**	**34.5**	**17.5**	**8**
Cincinnati	549	1.0	0.7	431	0.8	0.6	79	118	3.8	2.0	21
Cleveland	2,388	4.3	2.9	2,070	4.0	2.7	87	318	10.4	5.3	13
Columbus	232	0.4	0.3	203	0.4	0.3	87	29	1.0	0.5	13
Detroit	1,849	3.3	2.3	1,740	3.3	2.3	94	109	3.6	1.8	6
Toledo	77	0.1	0.1	75	0.1	0.1	97	2	0.1	0.0	3
Chicago	6,532	12.0	8.0	6,254	11.9	8.3	96	278	9.1	4.7	4
Indianapolis	183	0.3	0.2	160	0.3	0.2	87	23	1.0	0.4	13
Milwaukee	879	1.6	1.1	713	1.4	0.9	81	166	5.5	2.8	19
4. West North Central	**2,114**	**3.7**	**2.6**	**1,920**	**3.7**	**2.6**	**91**	**194**	**6.4**	**3.1**	**9**
Kansas City	506	0.9	0.6	497	0.9	0.7	98	9	0.3	0.0	2
Omaha	300	0.5	0.4	297	0.6	0.4	99	3	0.1	0.0	1
St. Louis	850	1.5	1.0	763	1.5	1.0	90	87	2.8	1.5	10
Minneapolis	322	0.6	0.4	244	0.5	0.3	76	78	2.6	1.3	24
St. Paul	136	0.2	0.2	119	0.2	0.2	88	17	0.6	0.3	13

TABLE 23—(Continued)

1925

Geographic division	From all states			From California				From all states but California			
	Unloads cars	Per cent of unloads	Per cent of U. S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Division 5-7	**2,077**	**3.6**	**2.6**	**1,894**	**3.5**	**2.7**	**91**	**183**	**6.1**	**3.0**	**9**
5. **South Atlantic**	**1,133**	**2.0**	**1.4**	**1,001**	**1.9**	**1.4**	**88**	**132**	**4.4**	**2.2**	**12**
Atlanta	129	0.2	0.2	129	0.2	0.2	100	0	0.0	0.0	0
Baltimore	720	1.3	0.9	656	1.3	0.9	91	64	2.1	1.1	9
Washington, D. C.	284	0.5	0.3	216	0.4	0.3	76	68	2.3	1.1	24
6. **East South Central**	**498**	**0.8**	**0.7**	**454**	**0.8**	**0.7**	**91**	**44**	**1.5**	**0.7**	**9**
Birmingham	124	0.2	0.2	117	0.2	0.2	94	7	0.3	0.1	6
Louisville	241	0.4	0.3	219	0.4	0.3	91	22	0.7	0.4	9
Memphis	133	0.2	0.2	118	0.2	0.2	89	15	0.5	0.2	11
7. **West South Central**	**446**	**0.8**	**0.5**	**439**	**0.8**	**0.6**	**98**	**7**	**0.2**	**0.1**	**2**
Fort Worth	97	0.2	0.1	94	0.2	0.1	97	3	0.1	0.0	3
Dallas	122	0.2	0.1	119	0.2	0.2	98	3	0.1	0.0	2
New Orleans	227	0.4	0.3	226	0.4	0.3	100	1	0.0	0.0	0
8. **Mountain**	**385**	**0.7**	**0.5**	**306**	**0.6**	**0.4**	**79**	**79**	**2.6**	**1.3**	**21**
Denver	299	0.5	0.4	226	0.4	0.3	76	73	2.4	1.2	24
Salt Lake City	86	0.2	0.1	80	0.2	0.1	93	6	0.2	0.1	7
9. **Pacific**	**3,888**	**7.0**	**4.8**	**3,822**	**7.3**	**5.1**	**98**	**66**	**2.2**	**1.1**	**2**
Spokane	71	0.1	0.1	35	0.1	0.1	49	36	1.2	0.6	51
Seattle	289	0.5	0.4	269	0.5	0.4	93	20	0.7	0.3	7
Portland	388	0.7	0.5	379	0.7	0.5	98	9	0.3	0.2	2
San Francisco	2,882	5.2	3.5	2,882	5.5	3.8	100	0	0.0	0.0	0
Los Angeles	258	0.5	0.3	257	0.5	0.3	100	1	0.0	.	0

TABLE 23—(Continued)

1926

Geographic division	From all states			From California				From all states but California			
	Unloads cars	Per cent of unloads	Per cent of U. S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Grand total	**53,928**	**100.0**	**69.0**	**45,566**	**100.0**	**70.9**	**85**	**8,362**	**100.0**	**60.2**	**15**
Divisions 1–4	**47,838**	**88.7**	**61.2**	**40,142**	**88.1**	**62.5**	**84**	**7,696**	**92.0**	**55.4**	**16**
1. New England	**5,286**	**9.9**	**6.8**	**4,618**	**10.1**	**7.2**	**87**	**668**	**8.0**	**4.8**	**13**
Boston	4,779	8.9	6.2	4,222	9.3	6.6	88	557	6.7	4.0	12
Providence	507	0.9	0.6	396	0.8	0.6	78	111	1.3	0.8	22
2. Middle Atlantic	**29,234**	**54.2**	**37.4**	**25,569**	**56.1**	**39.8**	**88**	**3,665**	**43.7**	**26.4**	**12**
Buffalo	609	1.3	0.8	604	1.3	0.9	99	5	0.0	0.0	1
Newark	2,235	4.1	2.9	2,123	4.7	3.3	95	112	1.3	0.8	5
New York	18,753	34.7	24.0	17,445	38.2	27.2	93	1,308	15.6	9.5	7
Philadelphia	4,630	8.5	5.9	3,445	7.6	5.4	74	1,185	14.2	8.5	26
Pittsburgh	3,007	5.6	3.8	1,952	4.3	3.0	65	1,055	12.6	7.6	35
3. East North Central	**11,293**	**20.9**	**14.4**	**8,529**	**18.8**	**13.3**	**76**	**2,764**	**33.1**	**19.9**	**24**
Cincinnati	562	1.0	0.7	302	0.7	0.5	54	260	3.1	1.9	46
Cleveland	1,294	2.4	1.7	1,170	2.6	1.8	90	124	1.5	0.9	10
Columbus	280	0.5	0.4	206	0.6	0.3	74	74	0.9	0.5	26
Detroit	1,679	3.1	2.1	1,458	3.2	2.3	87	221	2.6	1.6	13
Toledo	106	0.2	0.1	87	0.2	0.1	82	19	0.2	0.1	18
Chicago	5,822	10.9	7.4	4,524	9.8	7.1	78	1,298	15.6	9.3	22
Indianapolis	179	0.3	0.2	127	0.3	0.2	71	52	0.6	0.4	29
Milwaukee	1,371	2.5	1.8	655	1.4	1.0	48	716	8.6	5.2	52
4. West North Central	**2,025**	**3.8**	**2.6**	**1,426**	**3.1**	**2.2**	**70**	**599**	**7.2**	**4.3**	**30**
Kansas City	363	0.7	0.5	330	0.7	0.5	91	33	0.4	0.2	9
Omaha	186	0.3	0.2	185	0.4	0.3	99	1	0.0	0.0	1
St. Louis	772	1.4	1.0	536	1.2	0.8	69	236	2.8	1.7	31
Minneapolis	442	0.9	0.6	226	0.5	0.4	51	216	2.6	1.6	49
St. Paul	262	0.5	0.3	149	0.3	0.2	57	113	1.4	0.8	43

TABLE 23—(Concluded)

	From all states			From California				From all states but California			
							1926				
Geographic division	Unloads cars	Per cent of unloads	Per cent of U.S. total shipments	Unloads cars	Per cent of total California unloads	Per cent of total California shipments	Per cent of each city's unloads supplied by California	Unloads cars	Per cent of unloads	Per cent of shipments of these states	Per cent of each city's unloads supplied by these states
	1	2	3	4	5	6	7	8	9	10	11
Divisions 5-7	**2,051**	**3.8**	**2.6**	**1,615**	**3.5**	**2.5**	**79**	**436**	**5.3**	**3.2**	**21**
5. South Atlantic	**1,074**	**2.0**	**1.4**	**802**	**1.8**	**1.2**	**75**	**272**	**3.3**	**2.0**	**25**
Atlanta	126	0.2	0.2	118	0.3	0.2	94	8	0.1	0.1	6
Baltimore	711	1.3	0.9	553	1.2	0.8	78	158	1.9	1.1	22
Washington, D. C.	237	0.5	0.3	131	0.3	0.2	55	106	1.3	0.8	45
6. East South Central	**532**	**1.0**	**0.6**	**392**	**0.8**	**0.6**	**74**	**140**	**1.7**	**1.0**	**26**
Birmingham	107	0.2	0.1	98	0.2	0.1	92	9	0.1	0.1	8
Louisville	237	0.5	0.3	181	0.4	0.3	76	56	0.7	0.4	24
Memphis	188	0.3	0.2	113	0.2	0.2	60	75	0.9	0.5	40
7. West South Central	**445**	**0.8**	**0.6**	**421**	**0.9**	**0.7**	**95**	**24**	**0.3**	**0.2**	**5**
Fort Worth	82	0.1	0.1	74	0.2	0.1	90	8	0.1	0.1	10
Dallas	118	0.2	0.2	107	0.2	0.2	91	11	0.1	0.1	9
New Orleans	245	0.5	0.3	240	0.5	0.4	98	5	0.1	0.0	2
8. Mountain	**479**	**0.9**	**0.6**	**348**	**0.8**	**0.6**	**73**	**131**	**1.6**	**0.9**	**27**
Denver	376	0.7	0.5	246	0.6	0.4	65	130	1.6	0.9	35
Salt Lake City	103	0.2	0.1	102	0.2	0.2	99	1	0.0	0.0	1
9. Pacific	**3,560**	**6.6**	**4.6**	**3,461**	**7.6**	**5.3**	**97**	**99**	**1.2**	**0.7**	**3**
Spokane	68	0.1	0.1	33	0.0	0.0	49	35	0.4	0.3	51
Seattle	313	0.6	0.4	258	0.6	0.4	82	55	0.7	0.4	18
Portland	345	0.6	0.4	342	0.8	0.5	99	3	0.0	0.0	1
San Francisco	2,743	5.1	3.6	2,743	6.0	4.3	100	0	0.0	0.0	0
Los Angeles	91	0.2	0.1	85	0.2	0.1	93	6	0.1	0.0	7

Sources of data: Carlot unloads for 1924 and 1925 from Schultz, C. E. California Grape Deal for 1925 Season, pp. 67–71 (mimeo.), July, 1926, and for 1926 from mimeographed data compiled by the U. S. Bureau of Agricultural Economics. All percentages computed from carlot unloads as given in this table or from data on shipments in table 6, p. 38.

TABLE 24

FREIGHT AND REFRIGERATION RATES ON GRAPES BY RAIL FROM CALIFORNIA TO NEW YORK AND TO CHICAGO, 1909–1926

Destination	Rate per car			Rate per ton			Rate per 100 lbs.			Rate per crate			Rate per lug			Percent of average 1910-14		
	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Per cent	Per cent	Per cent
New York City 1910-1914 average	**299.00**	**91.50**	**390.70**	**23.40**	**7.16**	**30.56**	**1.17**	**.358**	**1.528**	**.318**	**.097**	**.415**	**.341**	**.104**	**.445**	**100**	**100**	**100**
1909	348.00	97.50	445.50	29.00	8.13	37.13	1.45	.406	1.856	.377	.106	.483	.406	.114	.520	118	109	116
1910	300.00	97.50	397.50	25.00	8.13	33.13	1.25	.406	1.656	.325	.106	.431	.350	.114	.464	102	109	104
1911	299.00	97.50	396.50	23.00	7.50	30.50	1.15	.375	1.525	.299	.098	.397	.322	.105	.427	94	101	95
1912-1917	299.00	87.50	386.50	23.00	6.73	29.73	1.15	.336	1.486	.322	.094	.416	.345	.101	.446	101	97	100
1918-1919[a]	374.40	87.50	461.90	28.80	6.73	35.53	1.44	.336	1.776	.403	.094	.497	.432	.101	.533	127	97	120
[b]	385.63	90.13	475.76	29.66	6.93	36.59	1.48	.346	1.829	.415	.097	.512	.445	.104	.549	130	100	123
1920-1921[a]	499.20	105.00	604.20	38.40	8.08	46.48	1.92	.402	2.324	.538	.113	.651	.576	.121	.697	169	116	157
[b]	514.18	108.15	622.33	39.55	8.32	47.87	1.98	.416	2.394	.554	.116	.670	.593	.124	.717	171	120	159
1922-1926	449.80	105.00	554.80	34.60	8.08	42.68	1.73	.403	2.133	.484	.113	.597	.519	.121	.640	152	116	144

[a] Rate excluding the war tax.
[b] Rate including the three-per-cent war tax.

TABLE 24—(*Concluded*)

Destination	Rate per car			Rate per ton			Rate per 100 lbs.			Rate per crate			Rate per lug			Per cent of average 1910-14		
	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total	Freight	Refrigeration	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Per cent	Per cent	Per cent
Chicago 1910-1914 average	**294.40**	**79.00**	**373.40**	**23.00**	**6.19**	**29.19**	**1.15**	**.309**	**1.459**	**.313**	**.084**	**.397**	**.336**	**.090**	**.426**	**100**	**100**	**100**
1909-1910	276.00	85.00	361.00	23.00	7.08	30.08	1.15	.354	1.504	.299	.092	.391	.322	.099	.421	95	110	98
1911	299.00	85.00	384.00	23.00	6.54	29.54	1.15	.327	1.477	.299	.085	.384	.322	.092	.414	95	101	97
1912-1917	299.00	75.00	374.00	23.00	5.77	28.77	1.15	.288	1.438	.322	.081	.403	.345	.086	.431	103	96	102
1918-1919[a]	374.40	75.00	449.40	28.80	5.77	34.57	1.44	.288	1.728	.403	.081	.484	.432	.086	.518	129	96	122
[b]	385.63	77.25	462.88	29.66	5.94	35.61	1.48	.297	1.780	.415	.083	.498	.445	.089	.534	132	99	125
1920-1921[a]	499.20	90.00	589.20	38.40	6.92	45.32	1.92	.346	2.266	.537	.097	.634	.576	.104	.680	172	115	160
[b]	514.18	92.70	606.88	39.55	7.13	46.68	1.98	.356	2.334	.554	.099	.653	.593	.107	.700	174	118	162
1922-1926	449.80	90.00	539.80	34.60	6.92	41.52	1.73	.346	2.076	.484	.097	.581	.519	.104	.623	155	115	146

[a] Rate excluding the war tax.
[b] Rate including the three-per-cent war tax.

Sources of data:

Col. 2. Computed by multiplying items in col. 8 by the number of hundred-weight per minimum carload of 240 for 1909 and 1910, and 260 for 1911 to date.

Col. 3. The basic refrigeration rate per minimum carload as compiled by the California Growers' and Shippers' Protective League. The same rates apply to all other fresh deciduous fruit shipments. Before 1912, however, the rate from different sections of California differed, and hence the rate from one section only in these years cannot be applied to all kinds of fruits.

Col. 5. Computed by multiplying items in col. 8 by 20 (the number of hundred-weight in a ton).

Col. 6. Computed by dividing col. 3 by the number of tons in a minimum carload.

Col. 8. The basic minimum carload freight rates per 100 pounds as compiled from the tariffs of the Southern Pacific Railroad. The same rates applied to all other fresh deciduous fruits, except to New York, Boston, Philadelphia, and Baltimore in 1910, in which year the special rate given to these points applied to straight cars of peaches and grapes only. The regular rate for other fruits to these points was $1.40.

Col. 9. Computed by dividing items in col. 3 by the number of hundred-weight in a minimum carload.

Col. 11. Computed by dividing the items in col. 8 by 100 and multiplying by the gross billing weight per crate employed by the railroads of 26 pounds, 1909-1911 inclusive, and 28 pounds (effective Sept. 15, 1911) 1912 to date.

Col. 12. Computed by dividing items in col. 3 by the minimum carload weight in pounds and multiplying by the gross billing weight per crate.

Col. 14. Computed by dividing items in col. 8 by 100 and multiplying by the approximate gross weight per lug of 28 pounds, 1909-1911, and 30 pounds, 1912 to date.

Col. 15. Computed by dividing items in col. 3 by the minimum carload weight in pounds and multiplying by the approximate gross weight per lug.

Col. 17 is computed from the freight rate per crate in col. 11; col. 18 from the base refrigeration rate per carload in col. 12; and col. 19 from the total freight and refrigeration rate per crate in col. 13.

TABLE 25

PRICES AND PURCHASING POWER OF CALIFORNIA GRAPES BY VARIETIES, 1917–1926.
EASTERN DELIVERED-AUCTION AND ESTIMATED F.O.B. SHIPPING POINT

		Estimated f.o.b. shipping points						Estimated f.o.b. shipping points				
	Gross auction price per lug	Price			Purchasing power		Gross auction price per lug	Price			Purchasing power	
Year		Per lug	Per net ton	Per cent of 1919	Per net ton	Per cent of 1919		Per lug	Per net ton	Per cent of 1919	Per net ton	Per cent of 1919
	Dol-lars	Dol-lars	Dol-lars	Per cent	Dol-lars	Per cent	Dol-lars	Dol-lars	Dol-lars	Per cent	Dol-lars	Per cent
	1	2	3	4	5	6	1	2	3	4	5	6
	ALICANTE BOUSCHET						CARIGNANE					
1917	1.37	.83	62.25	47.6	34.58	55.5	1.30	.76	57.00	51.6	31.67	60.2
1918	1.99	1.30	97.80	74.8	49.39	79.3	1.68	1.01	76.05	68.8	38.41	73.0
1919	2.46	1.74	130.80	100.0	62.29	100.0	2.18	1.48	110.55	100.0	52.64	100.0
1920	3.78	2.81	210.75	161.2	91.63	147.1	3.27	2.33	174.75	158.1	75.98	144.3
1921	2.96	2.05	153.75	117.5	102.50	164.6	2.49	1.64	123.00	111.3	82.00	155.8
1922	2.69	1.86	139.50	106.7	91.78	147.3	1.79	1.03	77.25	69.9	50.82	96.5
1923	2.26	1.46	109.50	83.7	70.19	112.7	2.03	1.25	93.75	84.8	60.10	114.2
1924	2.43	1.62	121.50	92.9	79.93	128.3	2.02	1.24	93.00	84.1	61.18	116.2
1925	2.05	1.27	95.25	72.8	58.80	94.4	1.54	.79	59.25	53.6	36.57	69.5
1926	1.65	.89	66.75	51.0	43.34	69.6	1.47	.73	54.75	49.5	35.55	67.5
	MISSION						PETITE SIRAH					
1917	1.30	.76	57.00	60.6	31.67	70.7	....	....	....	....	....	....
1918	1.73	1.06	79.80	84.8	40.30	90.0	2.29	1.58	118.80	142.2	60.00	150.8
1919	1.94	1.26	94.05	100.0	44.79	100.0	1.79	1.12	83.55	100.0	39.79	100.0
1920	3.18	2.25	168.75	179.4	73.37	163.8	2.93	2.02	151.50	181.3	65.87	165.5
1921	2.43	1.55	116.25	123.6	77.50	173.0	2.16	1.30	97.50	116.7	65.00	163.4
1922	1.43	.69	51.75	55.0	34.05	76.0	2.04	1.26	94.50	113.1	62.17	156.2
1923	1.66	.90	67.50	71.8	43.27	96.6	1.46	.72	54.00	64.6	34.62	87.0
1924	1.73	.97	72.75	77.4	47.86	106.9	1.75	.99	74.25	88.9	48.85	122.8
1925	1.11	.39	29.25	31.1	18.05	40.3	1.44	.70	52.50	62.8	32.41	81.5
1926	1.31	.58	43.50	46.3	28.25	63.1	1.27	.54	40.50	48.5	26.47	66.5
	ZINFANDEL						AVERAGE OF FOUR WINE VARIETIES (Excludes Alicante Bouschet)					
1917	1.16	.63	47.25	51.5	26.25	60.1	1.25	.72	54.00	56.5	30.00	65.9
1918	1.69	1.02	76.80	83.7	38.79	88.7	1.85	1.17	88.05	92.2	44.47	97.7
1919	1.91	1.23	91.80	100.0	43.71	100.0	1.96	1.27	95.55	100.0	45.50	100.0
1920	2.53	1.65	123.75	134.8	53.80	123.1	2.98	2.06	154.50	161.7	67.17	147.6
1921	1.94	1.10	82.50	89.9	55.00	125.8	2.26	1.40	105.00	109.9	70.00	153.8
1922	2.07	1.29	96.75	105.4	63.65	145.6	1.83	1.06	79.50	83.2	52.30	114.9
1923	1.49	.75	56.25	61.3	36.06	82.5	1.66	.90	67.50	70.6	43.27	95.1
1924	1.69	.93	69.75	76.0	45.89	105.0	1.74	.98	73.50	76.9	48.36	106.3
1925	1.55	.80	60.00	65.4	37.04	84.7	1.39	.65	48.75	51.0	30.09	66.1
1926	1.22	.50	37.50	40.9	24.35	55.7	1.32	.59	44.25	46.3	28.73	63.1
	AVERAGE OF FIVE WINE VARIETIES						AVERAGE OF MUSCAT AND THOMPSON SEEDLESS					
1917	1.28	.74	55.50	54.3	30.83	63.3	1.23	.70	52.50	65.2	29.17	76.0
1918	1.88	1.20	90.30	88.3	45.61	93.6	1.52	.87	64.80	80.4	32.73	85.3
1919	2.06	1.37	102.30	100.0	48.71	100.0	1.75	1.08	80.55	100.0	38.36	100.0
1920	3.14	2.21	165.75	162.0	72.06	147.9	2.02	1.17	87.75	108.9	38.15	99.5
1921	2.40	1.53	114.75	112.2	76.50	157.1	1.54	.73	54.75	68.0	36.50	95.2
1922	2.00	1.22	91.50	89.4	60.20	123.6	1.52	.77	57.75	71.7	37.99	99.0
1923	1.78	1.02	76.50	74.8	49.04	100.7	1.40	.66	49.50	61.5	31.73	82.7
1924	1.96	1.18	88.50	86.5	58.22	119.5	1.11	.39	29.25	36.3	19.24	50.2
1925	1.66	.90	67.50	66.0	41.67	85.5	1.09	.37	27.75	34.5	17.13	44.7
1926	1.50	.76	57.00	55.7	37.01	76.0	1.06	.35	26.25	32.6	17.05	44.4

TABLE 25—(*Concluded*)

Year	Estimated f.o.b. shipping points						Estimated f.o.b. shipping points					
	Gross auction price per lug	Price			Purchasing power		Gross auction price per lug	Price			Purchasing power	
		Per lug	Per net ton	Per cent of 1919	Per net ton	Per cent of 1919		Per lug	Per net ton	Per cent of 1919	Per net ton	Per cent of 1919
	Dol-lars	Dol-lars	Dol-lars	Per cent	Dol-lars	Per cent	Dol-lars	Dol-lars	Dol-lars	Per cent	Dol-lars	Per cent
	1	2	3	4	5	6	1	2	3	4	5	6
	MUSCAT						THOMPSON SEEDLESS					
1917	1.05	.53	39.75	56.7	22.08	66.2	1.40	.86	64.50	70.8	35.83	82.6
1918	1.49	.84	62.55	89.3	31.59	94.7	1.55	.89	67.05	73.6	33.86	78.1
1919	1.59	.93	70.05	100.0	33.36	100.0	1.90	1.21	91.05	100.0	43.36	100.0
1920	2.13	1.27	95.25	136.0	41.41	124.1	1.91	1.07	80.25	88.1	34.89	80.5
1921	1.54	.73	54.75	78.2	36.50	109.4	1.54	.73	54.75	60.1	36.50	84.2
1922	1.45	.71	53.25	76.0	35.03	105.0	1.58	.83	62.25	68.4	40.95	94.4
1923	1.13	.41	30.75	43.9	19.71	59.1	1.67	.92	69.00	75.8	44.23	102.0
1924	1.13	.41	30.75	43.9	20.23	60.6	1.09	.37	27.75	30.5	18.26	42.1
1925	1.07	.36	27.00	38.5	16.67	50.0	1.10	.38	28.50	31.3	17.60	40.6
1926	1.02	.31	23.25	33.2	15.10	45.3	1.09	.37	27.75	30.5	18.02	41.6
	CORNICHON											
1917	1.33	.79	59.25	50.5	32.92	58.9						
1918	2.13	1.43	107.55	91.7	54.32	97.2						
1919	2.27	1.56	117.30	100.0	55.86	100.0						
1920	2.83	1.92	144.00	122.8	62.61	112.1						
1921	2.39	1.52	114.00	97.2	76.00	136.1						
1922	1.61	.86	64.50	55.0	42.43	76.0						
1923	1.50	.76	57.00	48.6	36.54	65.4						
1924	1.50	.76	57.00	48.6	37.50	67.1						
1925	1.33	.60	45.00	38.4	27.78	49.7						
1926	1.27	.54	40.50	34.5	26.30	47.1						

Sources of data:

Col. 1. The prices of individual varieties are true or weighted seasonal average prices of daily delivered-aution sales. Averages of several varieties are simple or unweighted averages. All prices but those of Thompson Seedless are based on sales at New York City only, including Jersey City in the case of wine varieties and Muscats beginning with the 1924 season.   Years 1917-1923 cover the whole shipping season through December for all varieties and are computed from daily data compiled by the Stewart Fruit Company from the New York Fruit Reporter. Thompson Seedless prices, however, for 1917-1919 are Chicago prices per crate based on the Chicago Fruit and Vegetable Reporter. Years 1924-1926 include the season's sales from August through the middle of November only. Data for years 1924-1925 are from Schultz, C. E., California Grape Deal for 1925 Season (mimeo.), and year 1926 from U. S. Bur. Agr. Econ., Daily Market Report on California Grapes (mimeo.), No. **80**, p. 5. Nov. 6, 1926.

Col. 2. Computed by subtracting freight and refrigeration charges (see table 24, page 118) and a sales commission of 7 per cent from the gross eastern delivered-auction price in col. 1.

Col. 3. Computed from col. 2 by multiplying by 75, the approximate number of lugs of a gross weight of 30 lbs. in a short ton.

Col. 5. Col. 3 divided by the U. S. Bureau of Labor Statistics annual all-commodity wholesale price index for the U. S. as given in table 18, page 86.

TABLE 26

FARM PRICE AND PURCHASING POWER OF CHIEF FARM PRODUCTS OF CALIFORNIA
GRAPE-PRODUCING SECTIONS, 1919–1926

Year	Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power	
		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925
	1. ALL GRAPES			2. TABLE GRAPES			3. RAISIN GRAPES			4. WINE GRAPES		
	Per ton	Per ton	Per cent	Per ton	Per ton	Per cent	Per ton	Per ton	Per cent	Per ton	Per ton	Per cent
1919–1925 average...	**44.30**	**25.6**	**100**	**56**	**32.5**	**100**	**34.28**	**19.4**	**100**	**62**	**36.7**	**100**
1919...............	55.13	26.2	102	75	35.7	110	52.50	25.0	.129	50	23.8	65
1920...............	65.30	28.4	111	75	32.6	100	58.14	25.3	130	75	32.6	89
1921...............	61.70	41.1	161	80	53.3	164	46.94	31.3	161	82	54.7	149
1922...............	40.90	26.9	105	60	39.5	122	26.59	17.5	90	65	42.8	117
1923...............	25.86	16.6	65	40	25.6	79	17.75	11.4	59	40	25.6	70
1924...............	32.93	21.7	85	.40	26.3	81	18.02	11.8	61	63	41.5	113
1925...............	28.26	17.4	68	20	12.3	38	20.00	12.3	64	60	37.0	101
1926*...............	25.96*	16.9*	66*	25*	16.2*	50*	20.00*	13.0*	67*	45*	29.2*	80*

Year	Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power	
	5. DECIDUOUS TREE FRUITS			6. TRUCK CROPS			7. ALL FIELD CROPS			8. COTTON		
	Per ton	Per ton	Per cent	Per car-load	Per car-load	Per cent	Per ton	Per ton	Per cent	Per lb.	Per lb.	Per cent
1919–1925 average...	**63.41**	**36.4**	**100**	**965**	**570**	**100**	**25.72**	**14.9**	**100**	**.26**	**.153**	**100**
1919...............	87.46	41.6	114	1,012	482	85	35.91	17.1	115	.43	.205	134
1920...............	86.38	37.6	103	1,005	437	77	28.44	12.4	83	.18	.078	51
1921...............	60.75	40.5	111	732	489	86	17.60	11.7	79	.18	.120	78
1922...............	59.59	39.2	108	1,229	809	142	22.47	14.8	99	.26	.171	112
1923...............	39.20	25.1	69	1,178	756	133	24.05	˙15.4	103	.32	.205	134
1924...............	56.07	36.9	101	803	528	93	27.56	18.1	121	.24	.158	103
1925...............	54.39	33.6	92	798	492	86	23.98	14.8	99	.22	.136	89
1926*...............	45.46*	29.5*	81*	754*	489*	86*	20.78*	13.5*	91*	.14*	.091*	59*

TABLE 26—(*Concluded*)

Year	Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power		Price in dollars	Purchasing power	
		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925		Dollars	Per cent of 1919–1925
	9. HAY (tame)			10. BEANS			11. BUTTER			12. EGGS		
	Per ton	Per ton	Per cent	Per 100 lbs.	Per 100 lbs.	Per cent	Per lb.	Per lb.	Per cent	Per doz.	Per doz.	Per cent
1919–1925 average...	16	9.4	100	3.93	2.34	100	.509	.296	100	.403	.233	100
1919	17	8.1	86	4.35	2.07	88	.586	.279	94	.503	.240	103
1920	20	8.7	93	3.30	1.43	61	.625	.272	92	.510	.222	95
1921	11	7.3	78	2.80	1.87	80	.453	.302	102	.397	.265	113
1922	15	9.9	105	3.75	2.47	106	.436	.287	97	.332	.218	94
1923	14	8.9	95	4.00	2.56	109	.473	.303	102	.340	.218	94
1924	22	14.5	154	5.20	3.42	146	.471	.310	105	.349	.230	99
1925	14	8.6	91	4.10	2.53	108	.517	.319	108	.390	.241	103
1926*	12*	7.8*	83*	3.00*	1.95*	83*	.463*	.300*	101*	.338*	.219*	94*

Year	13. SWINE			14. CALIFORNIA FARM WAGES (without board)			15. RELATIVE U. S. GENERAL WAGES			16. RELATIVE PRICES OF NON-AGRICULTURAL COMMODITIES		
	Per head	Per head	Per cent	Per day	Per day	Per cent	Per cent of June, 1914	Per cent of 1910–1914	Per cent of 1919–1925	Per cent of 1910–1914	Per cent of 1910–1914	Per cent of 1919–1925
1919–1925 average...	13.13	7.6	100	3.75	2.19	100	209	124	100	182	105.6	100
1919	18.00	8.6	113	3.90	1.86	85	185	88	71	199	94.8	90
1920	14.50	6.3	83	4.60	2.00	91	222	96	78	241	104.8	99
1921	11.70	7.8	103	3.35	2.23	102	203	135	109	167	111.3	105
1922	11.80	7.8	103	3.40	2.24	102	197	130	105	168	110.5	105
1923	10.50	6.7	88	4.00	2.56	117	214	137	111	171	109.6	104
1924	10.20	6.7	88	3.40	2.24	102	218	143	116	162	106.6	101
1925	15.20	9.4	124	3.60	2.22	101	223	138	111	165	101.9	96
1926*	10.20*	6.6*	87*	3.65*	2.37*	108*	229*	149*	119*	161*	104.4*	99*

* 1926 data are preliminary and subject to revision.

Sources of data:

Items 1–10 and 13–14 are the final estimated farm prices, except that those for 1926 are preliminary and are from the California Crop Report for 1925 or mimeographed preliminary reports of the California Cooperative Crop Reporting Service. Truck crops do not include onions or potatoes, which are here included among field crops. California farm wages for 1923–1926 are averages of reported wages paid to hired farm labor in July. Preceding years are an average of quarterly reports. Year 1926 from Monthly Supplement of Crops and Markets for July.

Purchasing power per unit is actual price in the first column deflated or divided by the U. S. all-commodity wholesale price index for the corresponding year on a 1910–1914 base and given to the nearest tenth of a dollar only (see footnote to col. 5, table 18, p. 86).

The purchasing power for each year is expressed as a percentage of the average purchasing power for the years 1919–1925.

TABLE 27

UNITED STATES PRODUCTION, EXPORTS, IMPORTS, AND CONSUMPTION OF RAISINS; IMPORTS OF CURRANTS, AND CONSUMPTION OF RAISINS AND CURRANTS, 1909–1926

Year	Production Tons (1)	Production %1910-14 (2)	Exports Tons (3)	Exports % (4)	Imports Tons (5)	Imports % (6)	Currant imp. Tons (7)	Currant imp. % (8)	Raisin & currant imp. Tons (9)	Raisin & currant imp. % (10)	Cons. Raisins 1,000 lbs (11)	Cons. Raisins Tons (12)	Cons. Raisins % (13)	Cons. R&C 1,000 lbs (14)	Cons. R&C Tons (15)	Cons. R&C % (16)	Per cap. Raisins lbs (17)	Per cap. Raisins % (18)	Per cap. R&C lbs (19)	Per cap. R&C % (20)	Carryover Tons (21)
Average 1910-1914	75,900	100	11,540	100	1,633	100	17,970	100	19,603	100	143,410	71,705	100	179,350	89,675	100	1.51	100	1.89	100	
1909	70,000	92	5,151	45	2,610	160	16,215	90	18,825	96	136,856	68,428	95	169,287	84,644	94	1.51	100	1.87	99	
1910	62,500	82	9,275	80	1,511	93	16,895	94	18,407	94	126,141	63,071	88	159,932	79,966	89	1.37	91	1.73	92	
1911	65,000	86	10,178	88	1,780	109	17,798	99	19,578	100	132,667	66,333	93	168,262	84,131	94	1.42	94	1.80	95	
1912	95,000	125	13,855	120	1,154	71	23,628	131	24,782	126	177,804	88,902	124	225,061	112,531	125	1.87	124	2.37	125	
1913	66,000	87	8,539	74	1,782	109	15,462	86	17,244	88	114,064	57,032	80	144,989	72,495	81	1.18	78	1.50	79	
1914	91,000	120	15,854	137	1,937	119	16,065	89	18,002	92	166,374	83,187	116	198,504	99,252	111	1.70	113	2.03	107	
1915	128,000	169	35,299	306	802	49	12,620	70	13,423	68	199,147	99,574	139	224,388	112,194	125	2.00	132	2.26	120	
1916	132,000	174	26,869	233	879	54	8,028	45	8,907	45	208,233	104,117	145	224,289	112,145	125	2.07	137	2.23	118	
1917	163,000	215	27,327	237	495	30	397	2	892	5	278,543	139,272	194	279,337	139,669	156	2.73	181	2.73	144	
1918	167,000	220	46,121	400	50	3	2,546	14	2,596	13	281,442	140,721	196	286,534	143,267	160	2.72	180	2.77	147	
1919	182,500	240	35,411	307	783	48	7,426	41	8,210	42	335,894	167,947	234	350,746	175,373	196	3.20	212	3.34	177	
1920	177,000	233	15,215	132	23,020	1410	27,916	155	50,936	260	292,633	146,316	204	348,465	174,233	194	2.75	182	3.27	173	
1921	145,000	191	27,224	236	8,507	521	28,518	159	37,026	189	237,789	118,894	166	294,825	147,413	164	2.19	145	2.72	144	
1922	237,000	312	52,933	459	8,520	523	10,719	60	19,239	98	285,052	142,526	199	306,490	153,245	171	2.59	172	2.79	148	
1923	290,000	382	44,471	385	4,924	302	11,736	65	16,660	85	260,958	130,479	182	284,431	142,216	159	2.34	155	2.55	135	
1924	170,000	224	52,066	451	3,797	233	6,982	39	10,779	55	403,332	201,666	281	417,297	208,649	233	3.55	235	3.67	194	80,000
1925	200,000	264	65,619	569	3,969	243	7,096	39	11,065	56	391,218	195,609	273	405,410	202,705	226	3.39	225	3.51	186	100,000
1926*	260,000	343			2,557	157	6,658	37	9,215	47											120,000

* Data for 1926 are preliminary and subject to revision.

Sources of data:

Col. 1. Years 1909–1912 compiled from the California Fruit News. Years 1913–1918 from Associated Grower, Jan., 1923, p. 16; years 1919–1924 from California Crop Report for 1925, years 1925–1926 from preliminary Summary of California Annual Crop Report for 1926 (mimeo.), Jan. 5, 1927.

Col. 3. Compiled from U. S. Monthly Summary of Foreign Commerce. The twelve months of October of one year through September of the next are considered as the crop year.

Cols. 5 and 7. Years 1909–1918 compiled from December numbers of U. S. Monthly Summary of Foreign Commerce; years 1919–1926 from annual numbers of Foreign Commerce and Navigation of the United States.

Col. 9. Annual totals of items in col. 5 plus raisin exports by calendar years.

Col. 11. Years 1910–1925 compiled by the Sun-Maid Raisin Growers of California. Data for calendar years. Carryover items used since 1918 only.

Col. 14. Total of cols. 11 and 7 (converted to thousands of pounds).

Cols. 17 and 19. Computed by dividing data in cols. 11 and 14 respectively by the Bureau of Census' estimate of the total population of continental United States on July first. Data compiled from Statistical Abstracts of the United States.

Col. 21. Estimated portion of the previous year's raisin crop unsold and unmarketed on June first of the year indicated. Data on carryover for years 1922–1924 are from Nougaret, R. L., The California Grape Situation in 1924, Calif. Dept. Agr. Spec. Pub. 47:20. 1924. Data for year 1925 used in figure 29, is based on Proceed-ings of Fourth Regular Meeting of Pacific ...

TABLE 28

UNITED STATES MONTHLY SHIPMENTS OF GRAPES BY CHIEF SECTIONS OF ORIGIN, SEASONS 1920–1926

| Month | Number of carloads | | | | | | Per cent of United States total | | | | |
| | United States total | All States but California | California | | | | All States but California | California | | | |
			Total	Central District	Northern District	Southern District		Total	Central District	Northern District	Southern District
1920											
Season total....	**41,310**	**12,478**	**28,832**	**14,149**	**12,732**	**1,951**	**30.2**	**69.8**	**34.3**	**30.8**	**4.7**
June............	17	....	17	....	....	17	....	100.0	....	....	100.0
July............	389	6	383	151	6	226	1.5	98.5	38.9	1.5	58.1
August.........	5,195	74	5,121	3,861	973	287	1.4	98.6	74.3	18.8	5.5
September.....	12,958	2,257	10,701	4,484	5,179	1,038	17.4	82.6	34.5	40.0	8.1
October........	19,869	9,503	10,366	4,168	5,815	383	47.8	52.2	21.0	29.3	1.9
November......	2,857	637	2,220	1,461	759	....	22.3	77.7	51.1	26.6	....
December......	24	1	23	23	....	....	4.0	96.0	96.0	....	....
Jan.-Feb........	1	....	1	1	....	....	....	100.0	100.0	....	....
1921											
Season total....	**37,817**	**4,473**	**33,344**	**17,628**	**13,829**	**1,887**	**11.8**	**88.2**	**46.7**	**36.6**	**5.0**
June............	12	....	12	....	....	12	....	100.0	....	....	100.0
July............	430	12	418	207	....	211	2.8	97.2	48.2	....	48.9
August.........	3,403	293	3,110	2,616	362	132	8.5	91.5	76.9	10.7	3.9
September.....	17,062	2,734	14,328	7,258	6,001	1,069	16.0	84.0	42.5	35.2	6.3
October........	14,929	1,407	13,502	6,238	6,814	450	9.4	90.5	41.4	46.1	3.0
November......	1,973	7	1,966	1,301	652	13	0.4	99.6	66.0	33.0	0.6
December......	6	....	6	6	....	....	....	100.0	100.0	....	....
January.......	2	....	2	2	....	....	....	100.0	100.0	....	....
1922											
Season total....	**59,919**	**15,967**	**43,952**	**24,243**	**15,264**	**4,445**	**26.6**	**73 4**	**40.6**	**25 4**	**7 4**
June............	1	....	1	....	....	1	....	100.0	....	....	100.0
July............	324	9	315	95	....	220	2.8	97.2	29.3	....	67.9
August.........	4,751	823	3,928	3,400	363	165	17.3	82.7	71.6	7.6	3.5
September.....	22,451	5,900	16,551	7,476	6,890	2,185	26.3	73.7	33.3	30.7	9.7
October........	25,794	8,826	16,968	8,728	6,497	1,743	34.2	65.8	33.8	25.2	6.8
November......	6,366	399	5,967	4,349	1,489	129	6.3	93.7	68.3	23.4	2.0
December......	225	10	215	195	20	....	4.4	95.6	86.7	8.9	....
January.......	7	....	7	....	5	2	....	100.0	....	71.4	28.6
1923											
Season total....	**65,336**	**9,988**	**55,348**	**31,380**	**20,175**	**3,793**	**15.3**	**84.7**	**48.0**	**30.9**	**5.8**
June............	33	....	33	....	....	33	....	100.0	....	....	100.0
July............	593	16	577	231	6	340	2.7	97.3	39.0	1.0	57.3
August.........	5,785	245	5,540	4,812	519	209	4.2	95.8	83.2	9.0	3.6
September.....	23,492	3,044	20,448	10,432	8,189	1,827	13.0	87.0	44.4	34.9	7.8
October........	27,220	6,508	20,712	10,295	9,049	1,368	23.9	76.1	37.8	33.2	5.0
November......	7,474	175	7,299	4,919	2,366	14	2.3	97.7	65.8	31.7	1.9
December......	726	....	726	678	46	2	....	100.0	93.4	6.3	0.3
Jan.-Feb........	13	....	13	13	....	....	....	100.0	100.0	....	....

Number of carloads by months compiled from mimeographed releases of the U. S. Bureau of Agricultural Economics.

TABLE 28—(*Continued*)

| | Number of carloads | | | | | | Per cent of United States total | | | | |
| | | | California | | | | | California | | | |
Month	United States total	All States but California	Total	Central District	Northern District	Southern District	All States but California	Total	Central District	Northern District	Southern District
1924 *Season total*.....	69,933	12,238	57,695	36,827	17,204	3,664	17.5	82.5	52.7	24.6	5.2
June..................	7	....	7	....	....	7	....	100.0	....	....	100.0
July..................	1,251	35	1,216	. 710	5	501	2.8	97.2	56.8	0.4	40.0
August..............	7,447	282	7,165	5,926	1,160	79	3.4	96.2	79.6	15.6	1.1
September......	26,215	668	25,547	14,673	8,967	1,907	2.5	97.5	56.0	34.2	7.3
October...........	28,892	9,917	18,975	11,678	6,139	1,158	34.3	65.7	40.4	21.2	4.0
November........	5,982	1,304	4,678	3,743	931	4	21.8	78.2	62.6	15.6	0.1
December........	131	32	99	91	2	6	24.4	75.6	69.5	1.5	4.6
Jan.-Feb.........	8	....	8	6	....	2	....	100.0	75.0	....	25.0
1925* *Season total*.....	81,669	5,811	75,858	52,339	19,382	4,137	7.2	92.8	64.1	23.7	5.1
June..................	88	11	77	....	....	77	12.5	87.5	....	....	87.5
July..................	1,314	69	1,245	870	2	373	5.3	94.7	66.2	0.2	28.4
August..............	5,578	696	4,882	4,462	328	92	12.5	87.5	80.0	5.9	1.6
September......	34,769	1,526	33,243	20,842	10,120	2,281	4.4	95.6	59.9	29.1	6.6
October...........	34,274	3,340	30,934	21,337	8,327	1,270	9.7	90.3	62.3	24.3	3.7
November........	5,285	169	5,116	4,519	587	10	3.2	96.8	85.5	11.1	0.2
December........	327	....	327	288	18	21	....	100.0	88.1	5.5	6.4
Jan.-Feb.........	34	....	34	21	....	13	....	100.0	61.8	....	38.2
1926* *Season total*.....	77,564	14,506	63,058	43,632	16,397	3,029	18.7	81.3	56.2	21.2	3.9
June..................	118	89	29	....	....	29	75.4	24.6	....	....	24.6
July..................	2,257	455	1,802	1,635	12	155	20.2	79.8	72.5	0.5	6.8
August..............	8,033	763	7,270	4,794	2,209	267	9.5	90.5	59.6	27.5	3.4
September......	29,715	2,358	27,357	15,671	9,754	1,932	7.9	92.1	52.7	32.8	6.6
October...........	29,743	8,299	21,444	16,583	4,217	644	27.9	72.1	55.7	14.1	2.3
November........	7,252	2,533	4,719	4,512	205	2	34.9	65.1	62.2	2.8	0.1
December........	446	9	437	437	....	....	2.0	98.0	98.0	....	....

* Data for 1925 and 1926 are preliminary and subject to revision.

Number of carloads by months compiled from mimeographed releases of the U. S. Bureau of Agricultural Economics.